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6.2.7 Feature negotiation [87](#__RefHeading___Toc122712465)

7 Bindings of CDR field, Information Element and Resource Attribute [88](#__RefHeading___Toc122712466)

7.0 General [88](#__RefHeading___Toc122712467)

7.1 Bindings of common CDR field, Information Element and Resource Attribute [89](#__RefHeading___Toc122712468)

7.2 Bindings for 5G data connectivity [91](#__RefHeading___Toc122712469)

7.3 Bindings for SMS charging [95](#__RefHeading___Toc122712470)

7.4 Bindings for 5G connection and mobility [97](#__RefHeading___Toc122712471)

7.5 Bindings for Exposure Function Northbound API charging [99](#__RefHeading___Toc122712472)

7.6 Bindings for NS performance and Analytics charging [99](#__RefHeading___Toc122712473)

7.7 Bindings for NS Management charging [100](#__RefHeading___Toc122712474)

8 Security [100](#__RefHeading___Toc122712475)

Annex A (normative): OpenAPI specification [101](#__RefHeading___Toc122712476)

A.1 General [101](#__RefHeading___Toc122712477)

A.2 Nchf\_ConvergedCharging API [101](#__RefHeading___Toc122712478)

A.3 Nchf\_OfflineOnlyCharging API [121](#__RefHeading___Toc122712479)

Annex B (informative):Change history [131](#__RefHeading___Toc122712480)

# Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

# 1 Scope

The present document specifies the protocol that is used for service based interface. The API definitions and data type definitions are aligned with the common charging architecture specified in TS 32.240 [1]. The present document is related to other 3GPP charging TSs as follows:

- The common 3GPP charging architecture is specified in TS 32.240 [1].

- The 5G data connectivity charging is specified in TS 32.255 [30].

- The 5G connection and mobility charging is specified in TS 32.256 [31].

- The service, operations and procedures of 5G charging for service based interface is specified in TS 32.290 [58].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition of the 5G System are specified in 3GPP TS 29.500 [299] and 3GPP TS 29.501 [300].

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 32.240: "Telecommunication management; Charging management; Charging architecture and principles".

[2] - [13] Void.

[14] 3GPP TS 32.254: "Telecommunication management; Charging management; Exposure function Northbound Application Program Interfaces (APIs) charging ".

[15] - [28] Void.

[29] 3GPP TS 32.274: "Telecommunication management; Charging management;Short Message Service (SMS) charging".

[30] 3GPP TS 32.255: "Telecommunication management; Charging management; 5G Data connectivity domain charging; stage 2".

[31] 3GPP TS 32.256: "Telecommunication management; Charging management; 5G connection and mobility domain charging; stage 2".

[32] - [49] Void.

[50] - [57] Void.

[58] 3GPP TS 32.290: "Telecommunication management; Charging management; 5G system; Services, operations and procedures of charging using Service Based Interface (SBI).

[59] - [69] Void.[70] 3GPP TS 28.201: "Charging management; Network slice performance and analytics charging in the 5G System (5GS); Stage 2".

[71] 3GPP TS 28.202: "Charging management; Network slice management charging in the 5G System (5GS); Stage 2".

[72] - [99] Void.

[100] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[101] 3GPP TR 21.900: "Technical Specification Group working methods".

[102] - [199] Void

[200] - [252] Void

[253] 3GPP TS 28.532: "Management and orchestration; Management services".

[254] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

[255] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[256] 3GPP TS 28.554: "Management and orchestration;5G end to end Key Performance Indicators (KPI)".

[257] 3GPP TS 28.623: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions".

[258] - [298] Void

[299] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[300] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[301] 3GPP TS 29.594: "5G System; Spending Limit Control Service; Stage 3".

[302] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".

[303] 3GPP TS 24.501: "Non-Access-Stratum (NAS) Protocol for 5G System (5GS); Stage 3".

[304] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[305] 3GPP TS 29.510: "Network Function Repository Services; Stage 3".

[306] 3GPP TS 29.520: "5G System; Network Data Analytics Services;Stage 3".

[307] - [370] Void

[371] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[372] - [389] Void

[390] 3GPP TS 33.501: "Security architecture and procedures for 5G System".

[391] - [399] Void

[400] Void.

[401] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2) ".

[402] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format ".

[403] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[404] - [499] Void.

[500] OpenAPI: "OpenAPI 3.0.0 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md>.

[501] - [599] Void.

# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [100].

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

Nchf Service based interface exhibited by CHF.

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

AF Application Function

AMF Access and Mobility Management Function

ATSSS Access Traffic Steering, Switching, Splitting

CHF Charging Function

CEF Charging Enablement Function

CTF Charging Trigger Function

GPSI Generic Public Subscription Identifier

GUAMI Globally Unique AMF Identifier

I-SMF Intermediate SMF

MnS Management Service

NF Network Function

PEI Permanent Equipment Identifier

QBC QoS flow Based Charging

QFI QoS Flow Identifier

SMSF Short Message Service Function

SMF Session Management Function

SSC Session and Service Continuity

SUPI Subscription Permanent Identifier

# 4 Overview

## 4.1 Service architecture

The Converged Charging Service or Offline Only Charging Service is provided by the CHF to the consumer and shown in the SBI representation model in figure 4.1.1.

The ConvergedCharging Service (Nchf\_ ConvergedCharging) or Offline Only Charging Service (Nchf\_OfflineOnlyCharging) is part of the Nchf service-based interface exhibited by the Charging Function (CHF). The list of NF Service Consumer(s) is provided in Table 5.1-1.



Figure 4.1.1: Reference Architecture for the Nchf\_ConvergedCharging Service; SBI representation

## 4.2 Network functions

### 4.2.1 Charging Function (CHF)

The CHF is responsible for converged online charging and offline charging functionalities. The CHF provides the following:

- Quota;

- Re-authorisation triggers;

- Notification when Charging Domain determines rating conditions is affected or when CHF determines to terminate the charging service;

- Receiving service usage reports from NF Service Consumer; and

- CDRs generation.

### 4.2.2 NF Service Consumers

The NF Service Consumers shall support:

- Requesting and receiving the quota(s);

- Sending service usage reports; and

- Handling quota re-authorisation or abort notifications.

# 5 Services offered by the CHF

## 5.1 Introduction

The following services are provided by the CHF.

Table 5.1-1: NF Services provided by CHF

| Service Name | Description | Consumer |
| --- | --- | --- |
| Nchf\_ConvergedCharging service | This service provides a converged charging for session and event based NF services, with and without quota management, as well as charging information record generation | SMF, SMSF, AMF, NEF, PGW-C+SMF, CEF,  MnS Producer |
| Nchf\_OfflineOnlyCharging service | This service provides an offline only charging for session based NF service. | SMF |
| Nchf\_SpendingLimitControl | This service enables the PCF to retrieve policy counter status information per UE from the CHF by subscribing to spending limit reporting (i.e. notifications of policy counter status changes). | PCF |

The "Nchf\_SpendingLimitControl" service is defined in 29.594 [301].

## 5.2 Nchf\_ConvergedCharging service

### 5.2.1 Service description

This service provides charging in converged charging scenario by the CHF to the NF service consumer as defined in subclause 6.2 in 3GPP TS 32.290[58].

It includes the following functionalities:

- Create resource at service establishment or no existing ChargingData resource, and may allocate quotas based on the request from NF consumer;

- During the service consumption lifecycle, update resource upon receiving the quota usage or service usage report under a number of circumstances and allocate subsequent quotas based on the request from NF consumer;

- Release upon service termination, Unit Count Inactivity Timer expiry or error response; and

- Notify NF Service Consumer of the re-authorisation triggers when CHF determines rating conditions is affected, or the abort triggers when CHF determines to terminate the charging service.

- Charging information record generation

### 5.2.2 Service operations

#### 5.2.2.1 Introduction

The service operations defined for Nchf\_ ConvergedCharging are shown in table 5.2.2.1-1.

Table 5.2.2.1-2: Nchf\_ ConvergedCharging Operations

|  |  |  |  |
| --- | --- | --- | --- |
| Service Operation Name | Description | Initiated by | Corresponding Converged charging messages in 3GPP TS 32.290[58] |
| Nchf\_ ConvergedCharging\_Create | First Interrogation of unit reservation;  And/or initial report of service usage. | NF consumer | Charging Data Request/Response [Initial] |
| One Time request for the service. | Charging Data Request/Response [Event] |
| Nchf\_ ConvergedCharging\_Update | Intermediate Interrogation for subsequent units reservation when:   * the granted service unitfor one rating group are spent * expiry of granted service units validity time * service events occur, which might affect the rating of the current service   And/or Intermediate report of service usage. | NF consumer | Charging Data Request/Response [Update] |
| Nchf\_ ConvergedCharging\_Release | Final Interrogation without any unit reservation  And/or last report of service usage. | NF consumer | Charging Data Request/Response [Termination] |
| Nchf\_ ConvergedCharging\_Notify | Request that the user be re-authorized or the charging session context be terminated. | CHF | Charging Notify Request/Response |

#### 5.2.2.2 Nchf\_ConvergedCharging\_Create Operation

The Nchf\_ConvergedCharging\_Create service operation provides means for NF (CTF) to request quotas for service delivery or initial report of service usage.

The following procedures using the Nchf\_ConvergedCharging\_Create service operation are supported:

- No existing charging data resource.



Figure 5.2.2.2-1: Nchf\_ ConvergedCharging\_Create Service Operation

1. NF (CTF) sends a Nchf\_ConvergedCharging\_Create request to the CHF to create resource for charging. Requested quota and notification URI for Nchf\_ConvergedCharging\_Notify service operation are included in the request body.

2a. At successful operation, "201 Created" response is returned. In the "201 Created" response, the CHF includes a Location header field and the allocated quota in the body. The Location header field shall contain the URI of the created resource. The NF (CTF) shall use the URI received in the Location header in subsequent requests to the CHF for the same PDU session.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.2.3.1-3 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.7.3-1.

#### 5.2.2.3 Nchf\_ConvergedCharging\_Update Operation

The Nchf\_ConvergedCharging\_Update service operation provides means for NF (CTF) to update the charging data.

The following procedures using the Nchf\_ConvergedCharging\_Update service operation are supported:

- the granted service units for one rating group are spent

- expiry of granted service units' validity time

- charging events occur, which might affect the rating of the current service

- receiving re-authorization notification from CHF



Figure 5.2.2.3-1: Nchf\_ConvergedCharging\_Update Service Operation

1. NF (CTF) sends a Nchf\_ConvergedCharging\_Update request to the CHF. The {ChargingDataRef } in the URI identifies the "Charging Data" to be updated. The requested service unit and previous used service unit is included in the request body.

2a. At successful operation, "200 OK" response is returned. The CHF includes the granted service unit in the "200 OK" response.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.4.2.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.7.3-1.

#### 5.2.2.4 Nchf\_ConvergedCharging\_Release Operation

The Nchf\_ConvergedCharging\_Release service operation provides means for NF (CTF) to terminate charging Session.

The following procedures using the Nchf\_ConvergedCharging\_Release service operation are supported:

- Expiry of unit count inactivity timer in NF Consumer.

- Abort notification is received from CHF.

- Service termination in NF Consumer.



Figure 5.2.2.4-1: Nchf\_ConvergedCharging\_Release Service Operation

1. NF(CTF) sends a Nchf\_ConvergedCharging\_Release request to the CHF. The {ChargingDataRef } in the URI identifies the "Charging Data" to be updated and then released. The final used service unit is included in the request body.

2a. At successful operation, "204 No Content" response is returned.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.4.3.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.7.3-1.

#### 5.2.2.5 Nchf\_ConvergedCharging\_Notify Operation

The Nchf\_ConvergedCharging\_Notify service operation provides means for CHF to notify the NF(CTF) to update or terminate charging of the PDU Session.

The following procedures using the Nchf\_ConvergedCharging\_Notify service operation are supported:

- CHF determines re-authorization.

- CHF determines abort of charging.



Figure 5.2.2.5-1: Nchf\_ConvergedCharging\_Notify Service Operation

1. The CHF sends a Nchf\_ConvergedCharging\_Notify request to the NF (CTF). The {notifyUri} identifies the notification URI which is sent in the Nchf\_ConvergedCharging\_Create request. The notification type is included in the request body.

2a. At successful operation, "204 No Content" response is returned.

2b. On failure , one of the HTTP status code listed in Table 6.1.5.2.3.1-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.7.3-1.

After successful operation, when the NF Service Consumer receives a Charging Notify Request while not waiting for any Charging Data Response from the CHF, CTF can send a new Charging Data Request.

## 5.3 Nchf\_OfflineOnlyCharging service

### 5.3.1 Service description

This service provides charging in offline only charging scenario by the CHF to the NF service consumer (i.e. SMF) as defined in subclause 6.5 in 3GPP TS 32.290 [58].

It includes the following functionalities:

- Create resource at service establishment based on the request from NF consumer;

- During the service consumption lifecycle, update resource based on the request from NF consumer;

- Release upon service termination;

- Charging information record generation.

### 5.3.2 Service Operations

#### 5.3.2.1 Introduction

The service operations defined for Nchf\_OfflineOnlyCharging are shown in table 5.3.2.1-3.

Table 5.3.2.1-4: Nchf\_OfflineOnlyCharging Operations

|  |  |  |  |
| --- | --- | --- | --- |
| Service Operation Name | Description | Initiated by | Corresponding Offline only charging messages in 3GPP TS 32.290[58] |
| Nchf\_OfflineOnlyCharging\_Create | Initial report of service usage. | NF consumer | Charging Data Request/Response [Initial] |
| Nchf\_OfflineOnlyCharging\_Update | Intermediate report of service usage. | NF consumer | Charging Data Request/Response [Update] |
| Nchf\_OfflineOnlyCharging\_Release | Last report of service usage. | NF consumer | Charging Data Request/Response [Termination] |

#### 5.3.2.2 Nchf\_OfflineOnlyCharging\_Create Operation

The Nchf\_OfflineOnlyCharging\_Create operation provides means for NF (CTF) to request initial report of service usage.

The following procedures using the Nchf\_OfflineOnlyCharging\_Create service operation are supported:

- No existing charging data resource.



Figure 5.3.2.2-1: Nchf\_OfflineOnlyCharging\_Create Service Operation

1. NF (CTF) sends a Nchf\_OfflineOnlyCharging\_Create request to the CHF to create resource for starting charging.

2a. At successful operation, "201 Created" response is returned. In the "201 Created" response, the CHF includes a Location header field in the body. The Location header field shall contain the URI of the created resource. The NF (CTF) shall use the URI received in the Location header in subsequent requests to the CHF for the same PDU session.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.2.3.2.3.1-3 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.2.7.3-1.

#### 5.3.2.3 Nchf\_OfflineOnlyCharging\_Update Operation

The Nchf\_OfflineOnlyCharging\_Update operation provides means for NF (CTF) to update the charging data.

The following procedures using the Nchf\_OfflineOnlyCharging\_Update service operation are supported:

- charging events occur.



Figure 5.3.2.3-1: Nchf\_OfflineOnlyCharging\_Update Service Operation

1. NF (CTF) sends a Nchf\_OfflineOnlyCharging\_Update request to the CHF. The {OfflineChargingDataRef} in the URI identifies the "Offline Only Charging Data" to be updated. The used service unit is included in the request body.

2a. At successful operation, "200 OK" response is returned.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.2.3.3.4.2.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.2.7.3-1.

#### 5.3.2.4 Nchf\_OfflineOnlyCharging\_Release Operation

The Nchf\_OfflineOnlyCharging\_Release service operation provides means for NF (CTF) to terminate charging Session.

The following procedures using the Nchf\_OfflineOnlyCharging\_Release service operation are supported.



Figure 5.3.2.4-1: Nchf\_OfflineOnlyCharging\_Release Service Operation

1. NF(CTF) sends a Nchf\_OfflineOnlyCharging\_Release request to the CHF. The {OfflineChargingDataRef} in the URI identifies the "Offline Only Charging Data" to be updated and then released. The final used service unit is included in the request body.

2a. At successful operation, "204 No Content" response is returned.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.2.3.3.4.3.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.2.7.3-1.

# 6 API definitions

## 6.1 Nchf\_ ConvergedCharging Service API

### 6.1.1 Introduction

The APIs defined in this subclause implement the service operation defined in subclause 5.2.2.

The Nchf\_ConvergedCharging service shall use the Nchf\_ConvergedCharging API.

The request URI used in each HTTP request from the NF service consumer towards the CHF shall have the structure defined in subclause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

**{apiRoot}/{apiName}/{apiVersion}/{apiSpecificResourceUriPart}**

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The {apiName} shall be "nchf-convergedcharging".

- The {apiVersion} shall be "v3".

- The {apiSpecificResourceUriPart} shall be set as described in subclause 6.1.3.

### 6.1.2 Usage of HTTP

#### 6.1.2.1 General

HTTP/2 as described in IETF RFC 7540 [401] shall be used as specified in subclause 5.2 of 3GPP TS 29.500 [299].

#### 6.1.2.2 HTTP standard headers

##### 6.1.2.2.1 General

See subclause 5.2.2 of 3GPP TS 29.500 [299] for the usage of HTTP standard headers.

HTTP/2, shall be transported as specified in subclause 5.3 of 3GPP TS 29.500 [299].

##### 6.1.2.2.2 Content type

JSON, IETF RFC 8259 [402], shall be used as content type of the HTTP bodies specified in the present specification, as specified in subclause 5.4 of 3GPP TS 29.500 [299].

#### 6.1.2.3 HTTP custom headers

##### 6.1.2.3.1 General

HTTP custom headers specified in clause 5.2.3.2 of 3GPP TS 29.500 [299] shall be supported, and Optional HTTP custom headers specified in clause 5.2.3.3 of 3GPP TS 29.500[299] may be supported

No specific custom headers are defined in the present document.

### 6.1.3 Resources

#### 6.1.3.1 Overview



Figure 6.1.3.1-1: Resource URI structure of the Nchf\_ConvergedCharging API

Charging Data Ref is a unique identifier for a charging data resource in a PLMN. It’s created in CHF when CHF receives a Nchf\_ ConvergedCharging\_Create request and provided to NF (CTF) in the Location header field in the Nchf\_ ConvergedCharging\_Create response. The NF (CTF) shall use the Charging Data Ref received in subsequent requests to the CHF for the same charging data resource.

Table 6.1.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.1.3.1-1: Resources and methods overview

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method or custom operation | Description | Corresponding service operation |
| Charging Data | {apiRoot}/ nchf-convergedcharging/{apiVersion}/chargingdata | POST | Create a new Charging Data resource | Nchf\_ ConvergedCharging\_Create |
| Individual Charging Data | {apiRoot}/ nchf-convergedcharging/{apiVersion}/ chargingdata/{ChargingDataRef}/update | update  (POST) | Update an existing Charging Data resource. | Nchf\_ ConvergedCharging\_Update |
| {apiRoot}/ nchf-convergedcharging/{apiVersion}/ chargingdata /{ChargingDataRef}/release | release  (POST) | Update and release an existing Charging Data resource. | Nchf\_ ConvergedCharging\_Release |

#### 6.1.3.2 Resource: Charging Data

##### 6.1.3.2.1 Description

Charging Data resource represents a collection of the different charging data resources created by the CHF for converged charging as defined in 3GPP TS 32.290 [58].

##### 6.1.3.2.2 Resource Definition

Resource URI: **{apiRoot}/nchf-convergedcharging**/{apiVersion}**/chargingData**

This resource shall support the resource URI variables defined in table 6.1.3.2.2-1.

Table 6.1.3.2.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See subclause 6.1.1 |

##### 6.1.3.2.3 Resource Standard Methods

###### 6.1.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.1.3.2.3.1-1.

Table 6.1.3.2.3.1-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| n/a |  |  |  |  |

This method shall support the request data structures specified in table 6.1.3.2.3.1-2 and the response data structures and response codes specified in table 6.1.3.2.3.1-3.

Table 6.1.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| ChargingDataRequest | M | 1 | Parameters to create a new Charging Data resource. |

Table 6.1.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| ChargingDataResponse | M | 1 | 201 Created | The creation of a Charging Data resource is confirmed and a representation of that resource is returned.  The Charging Data resource which is created and returned successfully. The representation of created resource is identified via Location header field in the 201 response. |
| n/a |  |  | 307 Temporary Redirect | (NOTE 2) |
| ChargingDataResponse | M | 1 | 400  Bad Request | (NOTE 2) |
| ChargingDataResponse | M | 1 | 403  Forbidden | (NOTE 2) |
| ChargingDataResponse | M | 1 | 404  Not Found | (NOTE 2) |
| n/a |  |  | 405  Method Not Allowed | (NOTE 2) |
| n/a |  |  | 408  Request Timeout | (NOTE 2) |
| n/a |  |  | 410 Gone | (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply.  NOTE 2: Failure cases are described in subclause 6.1.7. | | | | |

##### 6.1.3.2.4 Resource Custom Operations

None.

#### 6.1.3.3 Resource: Individual Charging Data

##### 6.1.3.3.1 Description

Individual Charging Data resource represents a Charging data resource created in the CHF.

##### 6.1.3.3.2 Resource Definition

Resource URI: **{apiRoot}/nchf-convergedcharging/{apiVersion} /chargingdata/{ChargingDataRef}**

This resource shall support the resource URI variables defined in table 6.1.3.3.2-1.

Table 6.1.3.3.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See subclause 6.1.1 |
| ChargingDataRef | Charging data resource reference assigned by the CHF during the Nchf\_ ConvergedCharging\_Create operation, |

##### 6.1.3.3.3 Resource Standard Methods

None.

##### 6.1.3.3.4 Resource Custom Operations

###### 6.1.3.3.4.1 Overview

Table 6.1.3.3.4.1-1: Custom operations

|  |  |  |
| --- | --- | --- |
| Custom operation URI | Mapped HTTP method | Description |
| {apiRoot}/ nchf-convergedcharging/{apiVersion}/ chargingdata/{ChargingDataRef }/update | POST | Update an existing Charging Data resource. |
| {apiRoot}/ nchf-convergedcharging/{apiVersion}/ chargingdata /{ChargingDataRef}/release | POST | Update and release an existing Charging Data resource. |

###### 6.1.3.3.4.2 Operation: update

6.1.3.3.4.2.1 Description

This operation updates an existing Charging Data resource.

6.1.3.3.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.1.3.3.4.2.2-1 and the response data structures and response codes specified in table 6.1.3.3.4.2.2-2.

Table 6.1.3.3.4.2.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| ChargingDataRequest | M | 1 | Parameters to modify an existing Charging Data resource matching the ChargingDataRef according to the representation in the ChargingData.  The request URI is the representation in the Location header field in the 201 response of resource creation. |

Table 6.1.3.3.4.2.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| ChargingDataResponse | M | 1 | 200 OK | The modification of a Charging Data resource is confirmed and a representation of that resource is returned.  The Charging Data resource which is modified and returned successfully. |
| n/a |  |  | 307 Temporary Redirect | (NOTE 2) |
| ChargingDataResponse | M | 1 | 400  Bad Request | (NOTE 2) |
| ChargingDataResponse | M | 1 | 403  Forbidden | (NOTE 2) |
| ChargingDataResponse | M | 1 | 404  Not Found | (NOTE 2) |
| n/a |  |  | 405  Method Not Allowed | (NOTE 2) |
| n/a |  |  | 408  Request Timeout | (NOTE 2) |
| n/a |  |  | 410 Gone | (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply.  NOTE 2: Failure cases are described in subclause 6.1.7. | | | | |

###### 6.1.3.3.4.3 Operation: release

6.1.3.3.4.3.1 Description

This operation update and release an existing Charging session

6.1.3.3.4.3.2 Operation Definition

This operation shall support the request data structures specified in table 6.1.3.3.4.3.2-1 and the response data structures and response codes specified in table 6.1.3.3.4.3.2-2.

Table 6.1.3.3.4.3.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| ChargingDataRequest | M | 1 | Parameters to modify and then release the Charging Data resource matching the ChargingDataRef according to the representation in the ChargingData.  The request URI is the representation in the Location header field in the 201 response of resource creation. |

Table 6.1.3.3.4.3.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Successful case: The Charging Data resource matching the ChargingDataRef is modified and then released. |
| ChargingDataResponse | M | 1 | 404 Not Found | (NOTE 2) |
| n/a |  |  | 410 Gone | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.  NOTE 2: Failure cases are described in subclause 6.1.7. | | | | |

### 6.1.4 Custom Operations without associated resources

None.

### 6.1.5 Notifications

#### 6.1.5.1 General

Notifications shall comply to subclause 6.2 of 3GPP TS 29.500 [299] and subclause 4.6.2.3 of 3GPP TS 29.501 [300].

#### 6.1.5.2 Event Notification

##### 6.1.5.2.1 Description

The Notification is used by the CHF to notify NF consumers of the subscribed events is occurs , which implements the Nchf\_ ConvergedCharging\_Notify operation defined in 3GPP TS 32.290 [58].

##### 6.1.5.2.2 Target URI

The Notification URI **"{notifyUri}"** shall be used with the resource URI variables defined in table 6.1.5.2.2-1.

Table 6.1.5.2.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| notifyUri | String formatted as URI with the Notification URI is provided by the SMF during the creation of the Charging Data resource and within the ChargingData type, as defined in subclause 6.1.6. |

##### 6.1.5.2.3 Standard Methods

###### 6.1.5.2.3.1 POST

This method shall support the request data structures specified in table 6.1.5.2.3.1-1 and the response data structures and response codes specified in table 6.1.5.2.3.1-2.

Table 6.1.5.2.3.1-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| ChargingNotifyRequest | M | 1 | Provides Information about active Charging events. ChargingNotifyRequest data type is defined in subclause 6.1.6. |

Table 6.1.5.2.3.1-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| n/a |  |  | 204 No Content | The receipt of the Notification is acknowledged. |
| ChargingNotifyResponse | M | 1 | 400 Bad Request | (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply.  NOTE 2: Failure cases are described in subclause 6.1.7. | | | | |

### 6.1.6 Data Model

#### 6.1.6.1 General

This subclause specifies the application data model supported by the API.

The Nchf\_ConvergedCharging Service API allows the NF consumer to consume the converged charging service from the CHF as defined in 3GPP TS 32.290 [58].

Table 6.1.6.1-1 specifies the data types defined for the ConvergedCharging service based interface protocol.

Table 6.1.6.1-1: Nchf\_ ConvergedCharging specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| ChargingDataRequest | 6.1.6.2.1.1  6.1.6.2.2.1 | Describes the attributes of Charging Data Request to CHF for initial, update and termination of the charging session. |  |
| ChargingDataResponse | 6.1.6.2.1.2  6.1.6.2.2.2 | Describes the attributes of Charging Data Response from CHF on charging session initial, update and termination. |  |
| ChargingNotifyRequest | 6.1.6.2.1.3 | Describes Notifications about events that occurred in request message. |  |
| ChargingNotifyResponse | 6.1.6.2.1.16 | Describes the response of notification. |  |

Table 6.1.6.1-2 specifies data types re-used by the Nchf\_ConvergedCharging service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nchf\_ConvergedCharging service based interface.

Table 6.1.6.1-2: Nchf\_ConvergedCharging re-used Data Types

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Data type | Reference | | Comments | | Applicability |
| Supi | 3GPP TS 29.571 [371] | | The identification of the user (i.e. IMSI, NAI, GLI, GCI).  (NOTE 1) | |  |
| Uint32 | 3GPP TS 29.571 [371] | | Unsigned 32-bit integers | |  |
| Uint64 | 3GPP TS 29.571 [371] | | Unsigned 64-bit integers | |  |
| PduSessionId | 3GPP TS 29.571 [371] | | The identification of the PDU session. | |  |
| PduSessionType | 3GPP TS 29.571 [371] | | the type of a PDU session | |  |
| Uri | 3GPP TS 29.571 [371] | | String providing an URI | |  |
| AccessType | 3GPP TS 29.571 [371] | | The identification of the type of access network. | |  |
| DateTime | 3GPP TS 29.571 [371] | | The time. | |  |
| ChargingId | 3GPP TS 29.571 [371] | | Charging identifier allowing correlation of charging information | |  |
| RatType | 3GPP TS 29.571 [371] | | The identification of the RAT type. | |  |
| RatingGroup | 3GPP TS 29.571 [371] | | The identification of the rating group | |  |
| Ipv4Addr | 3GPP TS 29.571 [371] | | Ipv4 address. | |  |
| Ipv6Prefix | 3GPP TS 29.571 [371] | | The Ipv6 prefix allocated for the user. | |  |
| Ipv6Addr | 3GPP TS 29.571 [371] | | Ipv6 Address. | |  |
| Pei | 3GPP TS 29.571 [371] | | The Identification of a Permanent Equipment. | |  |
| TimeZone | 3GPP TS 29.571 [371] | | Time zone information | |  |
| NfInstanceId | 3GPP TS 29.571 [371] | | String uniquely identifying a NF instance. | |  |
| Gpsi | 3GPP TS 29.571 [371] | | String identifying a Gpsi | |  |
| DefaultQosInformation | 3GPP TS 29.571 [371] | | Identifies the information of the default QoS. | |  |
| SubscribedDefaultQos | 3GPP TS 29.571 [371] | | subscribed default QoS. | |  |
| AuthorizedDefaultQos | 3GPP TS 29.512 [302] | | Authorized default QoS. | |  |
| Ambr | 3GPP TS 29.571 [371] | | Aggregate Maximum Bit rate | |  |
| QosData | 3GPP TS 29.512 [302] | | Contains QoS parameters | |  |
| UserLocation | 3GPP TS 29.571 [371] | | User location information | |  |
| PlmnId | 3GPP TS 29.571 [371] | | PLMN id | |  |
| Guami | 3GPP TS 29.571 [371] | | Globally Unique AMF Identifier | |  |
| DurationSec | 3GPP TS 29.571 [371] | | Identifies a period of time in units of seconds. | |  |
| Snssai | 3GPP TS 29.571 [371] | | SNSSAI | |  |
| ProblemDetails | 3GPP TS 29.571 [371] | | additional details of the error | |  |
| ServiceId | 3GPP TS 29.571 [371] | | Identifier of service | |  |
| SscMode | 3GPP TS 29.571 [371] | | SSC Mode type | |  |
| PresenceInfo | 3GPP TS 29.571 [371] | | PRA information including PRAId, PRA element list and PRA status | |  |
| Qfi | 3GPP TS 29.571 [371] | | QoS flow identifier designated as "Qfi". | |  |
| AmfId | 3GPP TS 29.571 [371] | | AMF identifier | |  |
| Dnn | 3GPP TS 29.571 [371] | | Data Network Name | |  |
| GroupId | 3GPP TS 29.571 [371] | | Network internal Identifier for a group of IMSIs | |  |
| ExternalGroupId | 3GPP TS 29.571 [371] | | External Group Identifier for one or more subscriptions associated to a group of IMSIs | |  |
| Bytes | 3GPP TS 29.571 [371] | | String with format "byte" | |  |
| Tai | 3GPP TS 29.571 [371] | | Tracking Area Identifier | |  |
| Area | 3GPP TS 29.571 [371] | | List of TACs or Operator specific codes | |  |
| CoreNetworkType | 3GPP TS 29.571 [371] | | 5GC or EPC | |  |
| ServiceAreaRestriction | 3GPP TS 29.571 [371] | | Service Area restriction | |  |
| GlobalRanNodeId | 3GPP TS 29.571 [371] | | Global RAN Node Id | |  |
| QosCharacteristics | 3GPP TS 29.512 [302] | | Map of QoS characteristics for non standard 5QIs and non-preconfigured 5QIs. | |  |
| SupportedFeatures | 3GPP TS 29.571 [371] | | See 3GPP TS 29.500 [299] clause 6.6 | |  |
| NsiLoadLevelInfo | 3GPP TS 29.520 [306] | | Represents the load level information for an S-NSSAI and the associated network slice instance | |  |
| ServiceExperienceInfo | 3GPP TS 29.520 [306] | | ServiceExperience | |  |
| ApplicationChargingId | 3GPP TS 29.571 [371] | | Application provided charging identifier allowing correlation of charging information. | | AF\_Charging\_Identifier |
| SharingLevel | 3GPP TS 28.541 [254] | | Ressources sharing level | |  |
| MobilityLevel | 3GPP TS 28.541 [254] | | UE mobility Level | |  |
| SsT | 3GPP TS 28.541 [254] | | Slice Service type (SST) | |  |
| Support | 3GPP TS 28.541 [254] | | Supported, Not Supported indicator | |  |
| Float | 3GPP TS 29.571 [371] | | Number with format "float" | |  |
| MaPduIndication | 3GPP TS 29.512 [302] | | MA PDU session indication | | ATSSS |
| AtsssCapability | 3GPP TS 29.571 [371] | | ATSSS capabilities | | ATSSS |
| SteeringFunctionality | 3GPP TS 29.571 [371] | | Steering functionalities for MA PDU session | | ATSSS |
| SteeringMode | 3GPP TS 29.512 [302] | | Steering mode for MA PDU session | | ATSSS |
| OperationalState | 3GPP TS 28.623 [257] | | Operational state | |  |
| AdministrativeState | 3GPP TS 28.623 [257] | | Administrative state | |  |
| RanNasRelCause | 3GPP TS 29.512 [302] | Indicates the RAN or NAS release cause code information. | | EnhancedDiagnostics | |
| Ecgi | 3GPP TS 29.571 [371] | E-UTRA Cell Id | |  | |
| Ncgi | 3GPP TS 29.571 [371] | NR Cell Id | |  | |
| NOTE 1: A SUPI containing GLI or GCI is used to support 5G-RG and FN-RG in scenarios of wireline network. | | | | | |

#### 6.1.6.2 Structured data types

##### 6.1.6.2.1 Common Data Type

###### 6.1.6.2.1.1 Type ChargingDataRequest

Table 6.1.6.2.1.1-1: Definition of type ChargingDataRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| subscriberIdentifier | Supi | OM | 0..1 | Identifier of the subscriber that uses the requested service. |  |
| nfConsumerIdentification | NFIdentification | M | 1 | This is a grouped field which contains a set of information identifying the NF consumer of the charging service. |  |
| chargingId | ChargingId | OM | 0..1 | Charging identifier for correlation between different records. Only applicable if not available in the service specific information. |  |
| invocationTimeStamp | DateTime | M | 1 | The time at which the request is send |  |
| invocationSequenceNumber | Uint32 | M | 1 | This field contains the sequence number of the charging service invocation by the NF consumer, i.e. the order of charging data requests.  The sequence number in charging data request [initial] starts from 1, and increased by 1 for subsequent charging data request.  It is allowed to start from 0 for backwards compatibility. |  |
| retransmissionIndicator | boolean | OC | 0..1 | This field indicates, if included, this is a retransmitted request message. |  |
| oneTimeEvent | boolean | OC | 0..1 | Indicates, if included, that this is event based charging and whether this is a one-time event. If true, this is a one-time event that there will be no update or release. |  |
| oneTimeEventType | EventType | OC | 0..1 | Indicates the type of the one time event, i.e. Immediate or Post event charging. |  |
| notifyUri | Uri | OC | 0..1 | Identifies the recipient of Notifications sent by the CHF.  In case of session based charging it shall be present in create request message, and may be present in update. |  |
| supportedFeatures | SupportedFeatures | OC | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.1.8 is supported. |  |
| serviceSpecificationInfo | String | OC | 0..1 | Identifies service specific document that applies to the request, e.g. the service specific document ('middle tier' TS) and 3GPP release the service specific document is based upon. |  |
| multipleUnitUsage | array(MultipleUnitUsage) | OC | 0..N | This field contains the parameters for the quota management request and/or usage reporting. |  |
| triggers | array(Trigger) | OC | 0..N | This field identifies the event(s) triggering the request. |  |

###### 6.1.6.2.1.2 Type ChargingDataResponse

Table 6.1.6.2.1.2-1: Definition of type ChargingDataResponse

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| invocationTimestamp | DateTime | M | 1 | This field holds the timestamp of the charging service response from the CHF. |  |
| invocationResult | InvocationResult | OC | 0..1 | This field holds the result of charging service invocation by the NF consumer |  |
| invocationSequenceNumber | Uint32 | M | 1 | This field contains the sequence number of the charging service invocation by the NF consumer. The same value of the sequence number received in the request should be used in the response |  |
| sessionFailover | SessionFailover | OC | 0..1 | This field indicates whether alternative CHF is supported for ongoing charging service failover handling by NF consumer. |  |
| supportedFeatures | SupportedFeatures | OC | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.1.8 is supported. |  |
| multipleUnitInformation | array(MultipleUnitInformation) | OC | 0..N | This field holds the parameters for the quota management and/or usage reporting information. It may have multiple occurrences. |  |
| triggers | array(Trigger) | OC | 0..N | This field identifies the chargeable event(s) supplied by CHF to override/activate the existing chargeable event(s) in NF consumer.  The presence of the triggers attribute without any triggerType is used by CHF to disable all the triggers except rating group level triggers. |  |

###### 6.1.6.2.1.3 Type ChargingNotifyRequest

Table 6.1.6.2.1.3-1: Definition of type ChargingNotifyRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| notificationType | NotificationType | M | 1 | Type of notification to indicate re-authorization or termination. |  |
| reauthorizationDetails | array(ReauthorizationDetails) | OC | 0..N | descriptors for re-authorization to determine which quota or usage reporting to be updated. |  |

###### 6.1.6.2.1.4 Type NFIdentification

Table 6.1.6.2.1.4-1: Definition of type NFIdentification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| nodeFunctionality | NodeFunctionality | M | 1 | This field contains the function of the node. |  |
| nFName | NfInstanceId | OC | 0..1 | Identifier of NF instance. At least one of the nFName or nFIPv4Address or nFIPv6Address shall be present. |  |
| nFIPv4Address | Ipv4Addr | OC | 0..1 | The IPv4 address of the NF. At least one of the nFName or nFIPv4Address or nFIPv6Address shall be present. |  |
| nFIPv6Address | Ipv6Addr | OC | 0..1 | The IPv6 address of the NF. At least one of the nFName or nFIPv4Address or nFIPv6Address shall be present. |  |
| nFFqdn | string | OC | 0..1 | FQDN of the NF |  |
| nFPLMNID | PlmnId | OC | 0..1 | This field holds the PLMN ID of the network the NF belongs to. |  |

###### 6.1.6.2.1.5 Type MultipleUnitUsage

Table 6.1.6.2.1.5-1: Definition of type MultipleUnitUsage

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| ratingGroup | RatingGroup | M | 1 | The identifier of a rating group. |  |
| requestedUnit | RequestedUnit | OC | 0..1 | This field indicates, if included, that quota management is required. It may additionally contain the amount of requested service units for a particular category. |  |
| usedUnitContainer | array(UsedUnitContainer) | OC | 0..N | This field contains the amount of used non-monetary service units measured. |  |

###### 6.1.6.2.1.6 Type InvocationResult

Table 6.1.6.2.1.6-1: Definition of type InvocationResult

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| error | ProblemDetails | OC | 0..1 | More information on the error shall be provided in the "cause" attribute of the "ProblemDetails" structure in case of unsuccessful charging service invocation by the NF consumer.  The "invalidParams" attribute of the "ProblemDetails" structure shall contain invalid parameters which caused the rejection. |  |
| failureHandling | FailureHandling | OC | 0..1 | This field holds the failure handling to be performed by the NF consumer when charging service invocation is temporarily prevented. The provided value shall always override any already existing value in NF consumer.  In case of failure, it indicates which action to be performed by the NF consumer.  In case of success, it indicates which action to be performed by the NF consumer in case subsequent charging service invocation are temporarily prevented. |  |

###### 6.1.6.2.1.7 Type Trigger

Table 6.1.6.2.1.7-1: Definition of type Trigger

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | | P | | Cardinality | | Description | | Applicability |
| triggerType | TriggerType | | Oc | | 0..1 | | the events whose occurrence lead to charging event is issued towards the CHF | |  |
| triggerCategory | TriggerCategory | | M | | 1 | | This field indicates whether the charging data generated by the NF consumer for the trigger lead to a Charging Event towards the CHF immediately or not. | |  |
| timeLimit | DurationSec | | OC | | 0..1 | | Time limit if trigger type is "Expiry of data time limit" | |  |
| volumeLimit | Uint32 | | OC | | 0..1 | | Volume limit if trigger type is "Expiry of data volume limit". This attribute is not valid from Nchf\_ ConvergedCharging API version v2.0.0 | |  |
| volumeLimit64 | Uint64 | | OC | | 0..1 | | Volume limit if trigger type is "Expiry of data volume limit".  This attribute replaces the volumeLimit attribute from Nchf\_ ConvergedCharging API v2.0.0 | |  |
| eventLimit | Uint32 | | OC | | 0..1 | | Event limit if trigger type is "Expiry of data event limit". | |  |
| maxNumberOfccc | Uint32 | | OC | | 0..1 | | Maximum number if trigger type is "Max nb of number of charging condition changes" | |  |
| tariffTimeChange | DateTime | OC | | 0..1 | | This field contains UTC time indicating the switch time when the tariff will be changed. | |  | |

###### 6.1.6.2.1.8 Type MultipleUnitInformation

Table 6.1.6.2.1.8-1: Definition of type MultipleUnitInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| resultCode | ResultCode | OC | 0..1 | This field contains the result of the Rating group quota allocation. |  |
| ratingGroup | RatingGroup | M | 1 | The identifier of a rating group. |  |
| grantedUnit | GrantedUnit | OC | 0..1 | This field holds the granted quota. |  |
| triggers | array(Trigger) | OC | 0..N | This field holds triggers for usage reporting associated to the rating group, which is supplied from the CHF.  The presence of the triggers attribute without any triggerType is used by CHF to disable all the triggers to the associated rating group. |  |
| validityTime | DurationSec | OC | 0..1 | This field defines the time in order to limit the validity of the granted quota for a given category instance. |  |
| quotaHoldingTime | DurationSec | OC | 0..1 | This field holds the quota holding time in seconds. It applies equally to the granted time quota and to the granted volume quota.  The NF Consumer shall deem a quota to have expired when no traffic associated with the quota is observed for the value indicated by this attribute. A quotaHoldingTime value of zero indicates that this mechanism shall not be used. If the quotaHoldingTime attribute is not present, then a locally configurable default value in the NF Consumer shall be used. |  |
| finalUnitIndication | FinalUnitIndication | OC | 0..1 | This field indicates the granted final units for the service. |  |
| timeQuotaThreshold | integer | OC | 0..1 | indicates the threshold in seconds for the granted time quota. |  |
| volumeQuotaThreshold | Uint64 | OC | 0..1 | indicates the threshold in octets when the granted quota is volume |  |
| unitQuotaThreshold | integer | OC | 0..1 | indicates the threshold in service specific units, that are defined in the service specific documents, when the granted quota is service specific |  |

###### 6.1.6.2.1.9 Type RequestedUnit

Table 6.1.6.2.1.9-1: Definition of type RequestedUnit

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| time | Uint32 | OC | 0..1 | This field holds the amount of requested time (seconds). |  |
| totalVolume | Uint64 | OC | 0..1 | This field holds the amount of requested volume (bytes) in both uplink and downlink directions. |  |
| uplinkVolume | Uint64 | OC | 0..1 | This field holds the amount of requested volume (bytes)in uplink direction. |  |
| downlinkVolume | Uint64 | OC | 0..1 | This field holds the amount of requested volume (bytes) in downlink direction. |  |
| serviceSpecificUnits | Uint64 | OC | 0..1 | This field holds the amount of requested service specific units. |  |
| NOTE 1: f none of them is included, "RequestedUnit": {}, the category and amount are determined by CHF for online charging with centralized unit determination and rating scenario. | | | | | |

###### 6.1.6.2.1.10 Type UsedUnitContainer

Table 6.1.6.2.1.10-1: Definition of type UsedUnitContainer

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| serviceId | ServiceId | OC | 0..1 | This field identity of the used service |  |
| quotaManagementIndicator | QuotaManagementIndicator | OC | 0..1 | an indicator on whether the reported used units are with or without quota management control. If the attribute is not present, it indicates the used unit is without quota management applied. |  |
| triggers | array (Trigger) | OC | 0..N | This field specifies the reason for usage reporting for one or more types of unit associated to the rating group. |  |
| triggerTimestamp | DateTime | Oc | 0..1 | This field holds the timestamp when the reporting trigger occur. |  |
| time | Uint32 | OC | 0..1 | This field holds the amount of used time (seconds). |  |
| totalVolume | Uint64 | OC | 0..1 | This field holds the amount of used volume(bytes) in both uplink and downlink directions. |  |
| uplinkVolume | Uint64 | OC | 0..1 | This field holds the amount of used volume(bytes) in uplink direction. |  |
| downlinkVolume | Uint64 | OC | 0..1 | This field holds the amount of used volume(bytes) in downlink direction. |  |
| serviceSpecific Units | Uint64 | OC | 0..1 | This field holds the amount of used service specific units. |  |
| eventTimeStamps | Array(DateTime) | OC | 0..N | This field holds the timestamps of the event reported in the Service Specific Unit.s, if the reported units are event based |  |
| localSequenceNumber | integer | M | 1 | holds the Used Unit sequence number, i.e. the order when charging event occurs. It starts from 1 and increased by 1 for each Used Unit generation. |  |

###### 6.1.6.2.1.11 Type GrantedUnit

Table 6.1.6.2.1.11-1: Definition of type GrantedUnit

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| tariffTimeChange | DateTime | OC | 0..1 | This field contains UTC time indicating the switch time when the tariff will be changed. |  |
| time | Uint32 | OC | 0..1 | This field holds the amount of granted time (seconds). |  |
| totalVolume | Uint64 | OC | 0..1 | This field holds the amount of granted volume(bytes) in both uplink and downlink directions. |  |
| uplinkVolume | Uint64 | OC | 0..1 | This field holds the amount of granted volume(bytes) in uplink direction. |  |
| downlinkVolume | Uint64 | OC | 0..1 | This field holds the amount of granted volume(bytes) in downlink direction. |  |
| serviceSpecificUnits | Uint64 | OC | 0..1 | This field holds the amount of granted requested service specific units. |  |

###### 6.1.6.2.1.12 Type FinalUnitIndication

Table 6.1.6.2.1.12-1: Definition of type FinalUnitIndication

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| finalUnitAction | FinalUnitAction | M | 1 | indicates to the service consumer the action to be taken when the user's account cannot cover the service cost |  |
| restrictionFilterRule | IPFilterRule | OC | 0..1 | filter rules corresponding to services that are to remain accessible even if there are no more service units granted. |  |
| filterId | string | OC | 0..1 | the IP packet filters corresponding to services that are to remain accessible even if there are no more service units granted. |  |
| redirectServer | RedirectServer | OC | 0..1 | the address information of the redirect server with which the end user is to be connected when the account cannot cover the service cost. |  |

###### 6.1.6.2.1.13 Type RedirectServer

Table 6.1.6.2.1.13-1: Definition of type RedirectServer

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| redirectAddressType | RedirectAddressType | M | 1 | The type of redirect server address |  |
| redirectServerAddress | string | M | 1 | the address of redirect server |  |

###### 6.1.6.2.1.14 Type ReauthorizationDetails

Table 6.1.6.2.1.14-1: Definition of type ReauthorizationDetails

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| service | ServiceId | OC | 0..1 | identifier for a service |  |
| ratingGroup | RatingGroup | OC | 0..1 | identifier of a rating group.  This attribute shall be present if serviceIdentifier attribute is present. |  |
| quotaManagementIndicator | QuotaManagementIndicator | OC | 0..1 | an indicator on whether the re-authorization notification is for quota management control or not. |  |

###### 6.1.6.2.1.15 Void

###### 6.1.6.2.1.16 Type ChargingNotifyResponse

Table 6.1.6.2.1.16-1: Definition of type ChargingNotifyResponse

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| invocationResult | InvocationResult | OC | 0..1 | This field holds the result of notification. |  |

##### 6.1.6.2.2 5G Data Connectivity Specified Data Type

###### 6.1.6.2.2.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for 5G data connectivity charging described in 3GPP TS 32.255[30].

Table 6.1.6.2.2.1-1: 5G Data Connectivity Specified attribute of type ChargingDataRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| pDUSessionChargingInformation | PDUSessionChargingInformation | OM | 0..1 | This field holds the 5G data connectivity specific information. |  |
| roamingQBCInformation | RoamingQBCInformation | OM | 0..1 | This field holds the 5G data connectivity specific information roaming QBC. |  |

###### 6.1.6.2.2.2 Type ChargingDataResponse

This clause is additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 for 5G data connectivity charging described in 3GPP TS 32.255[30].

Table 6.1.6.2.2.2-1: 5G Data Connectivity Specified attribute of type ChargingDataResponse

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| pDUSessionChargingInformation | PDUSessionChargingInformation | OM | 0..1 | This field holds the 5G data connectivity specific information. |  |
| roamingQBCInformation | RoamingQBCInformation | OM | 0..1 | This field holds the 5G data connectivity specific information roaming QBC. |  |

###### 6.1.6.2.2.3 Type MultipleUnitUsage

This clause is additional attributes of the type MultipleUnitUsage defined in clause 6.1.6.2.1.5 for 5G data connectivity charging described in 3GPP TS 32.255[30].

Table 6.1.6.2.2.3-1: 5G Data Connectivity Specified attribute of type MultipleUnitUsage

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| uPFID | NfInstanceId | OC | 0..1 | identifier of UPF |  |
| multihomedPDUAddress | PDUAddress | OC | 0..1 | IPv6 prefix used by UPF. It may only be used for IPv6 multi-homed PDU sessions and then only for reporting used units. |  |

###### 6.1.6.2.2.4 Type MultipleUnitInformation

This clause is additional attributes of the type MultipleUnitInformationdefined in clause 6.1.6.2.1.8 for 5G data connectivity charging described in 3GPP TS 32.255[30].

Table 6.1.6.2.2.4-1: 5G Data Connectivity Specified attribute of type MultipleUnitInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| uPFID | NfInstanceId | Oc | 0..1 | UPF id |  |

###### 6.1.6.2.2.5 Type UsedUnitContainer

This clause is additional portion of the type UsedUnitContainer defined in clause 6.1.6.2.1.10 for 5G data connectivity charging described in 3GPP TS 32.255[30].

Table 6.1.6.2.2.5-1: 5G Data Connectivity Specified portion of type UsedUnitContainer

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| pDUContainerInformation | PDUContainerInformation | OC | 0..1 | the 5G data connectivity specific information |  |

###### 6.1.6.2.2.6 Type PDUSessionChargingInformation

Table 6.1.6.2.2.6-1: Definition of type PDUSessionChargingInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| chargingId | ChargingId | OM | 0..1 | Charging identifier for correlation between different records of a single PDU session |  |
| homeProvided ChargingId | ChargingId | Oc | 0..1 | Charging identifier for correlation between H-SMF and V-SMF. |  |
| userInformation | UserInformation | OM | 0..1 | including information of user and user equipment, |  |
| userLocationinfo | UserLocation | OC | 0..1 | provides information on the location |  |
| mAPDUNon3GPPUserLocationInfo | UserLocation | OC | 0..1 | provides information on the location under the non-3GPP access for the MA PDU session | ATSSS |
| non3GPPUserLocationTime | DateTime | OC | 0..1 | represents the UTC time provided by the non-3GPP access, and is related to the userLocationTime. This filed is only present if the non-3GPP access provides a time. |  |
| mAPDUNon3GPPUserLocationTime | DateTime | OC | 0..1 | represents the UTC time provided by the non-3GPP access, and is related mAPDUNon3GPPUserLocationInfo.  This filed is only present if the non-3GPP access for the MA PDU session provides a time. | ATSSS |
| presenceReportingAreaInformation | map(PresenceInfo) | OC | 0..N | When the data type is present in response message, it includes the PRA information provisioned by the CHF, in which case the "presenceState" attribute within the PresenceInfo data type shall not be supplied. When the data type is present in request message, it’s used to report user presence reporting area status.  The "praId" attribute within the PresenceInfo data type shall be the key of the map.  The location related attributes (i.e. "trackingAreaList", "ecgiList", "ncgiList") within the PresenceInfo data type are not required in the request message, and may be ignored by the CHF. |  |
| uetimeZone | TimeZone | OC | 0..1 | the UE Timezone the UE is currently located |  |
| pduSessionInformation | PDUSessionInformation | OC | 0..1 | PDU session level information, including PDU session ID, PDU type, SSC Mode, QoS, network slicing etc.  It needs to be present in the request, but it is optional in the response. |  |
| unitCountInactivityTimer | DurationSec | OC | 0..1 | threshold for the time period resource idle  Upon the initial interaction with the CHF, the SMF use this attribute to provide pre-configured threshold to CHF.  when present in response message, it contains the threshold supplied by CHF in response of initial request to override existing threshold in SMF.  It’s only present when unit count inactivity timer trigger is active. |  |
| rANSecondaryRATUsageReport | RANSecondaryRATUsageReport | OC | 0..1 | Secondary RAT usage reported from RAN. |  |

###### 6.1.6.2.2.7 Type UserInformation

Table 6.1.6.2.2.7-1: Definition of type UserInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| servedGPSI | Gpsi | OC | 0..1 | the Generic Public Subscription Identifier (GPSI) of the served party, if available. |  |
| servedPEI | Pei | OC | 0..1 | the identification of Permanent Equipment Identifier. |  |
| unauthenticatedFlag | boolean | OC | 0..1 | indicates the served SUPI is not authenticated |  |
| roamerInOut | RoamerInOut | OC | 0..1 | In-bound or Out-bound roamer |  |

###### 6.1.6.2.2.8 Type PDUSessionInformation

Table 6.1.6.2.2.8-1: Definition of type PDUSessionInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| networkSlicingInfo | NetworkSlicingInfo | OM | 0..1 | information of network slice serving the PDU session |  |
| pduSessionID | PduSessionId | M | 1 |  |  |
| pduType | PduSessionType | OM | 0..1 | type of the PDU session |  |
| sscMode | SscMode | OC | 0..1 | information of SSC Mode type. |  |
| hPlmnId | PlmnId | OC | 0..1 | PLMN identifier of the home network |  |
| servingNetworkFunctionID | ServingNetworkFunctionID | OC | 0..1 | This field holds serving Network Function identifier. |  |
| servingCNPlmnId | PlmnId | OC | 0..1 | Serving Core Network Operator PLMN ID selected by the UE in shared networks. |  |
| ratType | RatType | OC | 0..1 | the RAT Type of the PDU session |  |
| mAPDUNon3GPPRATType | RatType | OC | 0..1 | the RAT Type of non-3GPP access for the MA PDU session | ATSSS |
| dnnId | Dnn | M | 1 | a Data Network Name |  |
| dnnSelectionMode | DnnSelectionMode | OC | 0..1 | This field indicates how the DNN was selected. |  |
| chargingCharacteristics | string | OC | 0..1 | the Charging Characteristics for this PDU session.  It carries the value in hexadecimal representation  Pattern: '^[0-9a-fA-F]{1,4}$' |  |
| chargingCharacteristicsSelectionMode | ChargingCharacteristicsSelectionMode | OC | 0..1 | information about how the "Charging Characteristics" was selected. |  |
| startTime | DateTime | OC | 0..1 | the UTC time which represents the start of a PDU session at the SMF |  |
| stopTime | DateTime | OC | 0..1 | the UTC time which represents the stop of a PDU session at the SMF |  |
| 3gppPSDataOffStatus | 3GPPPSDataOffStatus | OC | 0..1 | This field holds the 3GPP Data off Status when UE’s 3GPP Data Off status is Activated or Deactivated. |  |
| sessionStopIndicator | boolean | OC | 0..1 | This field indicates to the CHF that the PDU session has been terminated. |  |
| pduAddress | PDUAddress | OC | 0..1 | Group of user ip address/prefix |  |
| diagnostics | Diagnostics | OC | 0..1 | provides a detailed cause value from SMF. |  |
| enhancedDiagnostics | EnhancedDiagnostics5G | OC | 0..N | provides a more detailed cause value from SMF. | EnhancedDiagnostics |
| authorizedQoSInformation | AuthorizedDefaultQos | OC | 0..1 | This field holds the authorized QoS applied to PDU session. |  |
| subscribedQoSInformation | SubscribedDefaultQos | OC | 0..1 | This field holds the subscribed Default QoS |  |
| authorizedSessionAMBR | Ambr | OC | 0..1 | This field holds the authorized session-AMBR. |  |
| subscribedSessionAMBR | Ambr | OC | 0..1 | This field holds the subscribed session-AMBR. |  |
| mAPDUSessionInformation | MAPDUSessionInformation | OC | 0..1 | This field holds the MA PDU session information. | ATSSS |

###### 6.1.6.2.2.9 Type PDUContainerInformation

Table 6.1.6.2.2.9-1: Definition of type PDUContainerInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| timeofFirstUsage | DateTime | OC | 0..1 | the UTC time indicating time stamp for the first IP packet to be transmitted and mapped to the reporting used unit. |  |
| timeofLastUsage | DateTime | OC | 0..1 | the UTC time indicating time stamp for the last IP packet to be transmitted and mapped to the reporting used unit. |  |
| qoSInformation | QoSData | OC | 0..1 | the QoS applied for the reporting used unit.  In case gbrUl or gbrDl are present for GBR flow, the GBR targets are "GUARANTEED", otherwise, are " NOT\_GUARANTEED". |  |
| qoSCharacteristics | QosCharacteristics | OC | 0..1 | Map of QoS characteristics for non standard 5QIs and non-preconfigured 5QIs. |  |
| afChargingIdentifier | ChargingId | OC | 0..1 | An identifier, provided from the AF, may be used to correlate the measurement for the Charging key/Service identifier values in this PCC rule with application level reports. |  |
| afChargingIdString | ApplicationChargingId | OC | 0..1 | Used instead of afChargingIdentifier when feature is active. | AF\_Charging\_Identifier |
| userLocationInformation | UserLocation | OC | 0..1 | provides information on the location |  |
| uetimeZone | TimeZone | OC | 0..1 | the UE Time Zone during the used unit container interval. |  |
| rATType | RatType | OC | 0..1 | the RAT Type of the used unit |  |
| servingNodeID | array(ServingNetworkFunctionID) | OC | 0..N | the list of serving node identifiers during the used unit container interval. |  |
| presenceReportingAreaInformation | map(PresenceInfo) | OC | 0..N | the Presence Reporting Area status of UE during the used unit container interval. |  |
| 3gppPSDataOffStatus | 3GPPPSDataOffStatus | OC | 0..1 | the 3GPP Data off Status during the used unit container interval. |  |
| sponsorIdentity | string | OC | 0..1 | an identifier of the sponsor. |  |
| applicationserviceProviderIdentity | string | OC | 0..1 | an identifier of the application service provider |  |
| chargingRuleBaseName | string | OC | 0..1 | the reference to group of PCC rules predefined at the SMF. |  |
| mAPDUSteeringFunctionality | SteeringFunctionality | OC | 0..1 | Steering functionality . | ATSSS |
| mAPDUSteeringMode | SteeringMode | OC | 0..1 | Steering Mode | ATSSS |

###### 6.1.6.2.2.10 Type NetworkSlicingInfo

Table 6.1.6.2.2.10-1: Definition of type NetworkSlicingInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| sNSSAI | Snssai | M | 1 | Single Network Slice Selection Assistance Information |  |

###### 6.1.6.2.2.11 Type PDUAddress

Table 6.1.6.2.2.11-1: Definition of type PDUAddress

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| pduIPv4Address | Ipv4Addr | OC | 0..1 | the IPv4 address of the served SUPI allocated for the PDU session |  |
| pduIPv6AddresswithPrefix | Ipv6Addr | OC | 0..1 | the IPv6 address with prefix of the served SUPI allocated for the PDU session |  |
| pduAddressprefixlength | integer | OC | 0..1 | PDU Address prefix length of an IPv6 typed Served PDU Address. The field needs not available for prefix length of 64 bits. |  |
| iPv4dynamicAddressFlag | boolean | OC | 0..1 | This field indicates whether served IPv4 address is dynamically allocated. This field is missing if address is static. |  |
| iPv6dynamicPrefixFlag | boolean | OC | 0..1 | This field indicates whether served IPv6 address prefix is dynamically allocated. This field is missing if address is static. |  |
| addIpv6AddrPrefixes | array(Ipv6Prefix) | OC | 0..N | List of additional IPv6 prefix allocated for the PDU session |  |
| addIpv6AddrPrefixList | array(Ipv6Prefix) | OC | 0..N | List of additional IPv6 prefix allocated for the PDU session. |  |
| NOTE 1: If both the addIpv6AddrPrefixList and addIpv6AddrPrefixes are included, the IPv6 address prefix in addIpv6AddrPrefixes is also present in the addIpv6AddrPrefixList. | | | | | |

###### 6.1.6.2.2.12 Type ServingNetworkFunctionID

Table 6.1.6.2.2.12-1: Definition of type ServingNetworkFunctionID

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| servingNetworkFunctionInformation | NFIdentification | M | 1 | Serving Network Function information: i.e. AMF, I-SMF, SGW, V-SMF, or ePDG.  For V-SMF, the NFIdentification.nodeFunctionality shall have the value SMF. |  |
| aMFId | AmfId | OC | 0..1 | AMF identifier |  |

###### 6.1.6.2.2.13 Type RoamingQBCInformation

Table 6.1.6.2.1.13-1: Definition of type RoamingQBCInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| multipleQFIcontainer | array(MultipleQFIcontainer) | Oc | 0..N | list of QFI containers |  |
| uPFID | NfInstanceId | OC | 0..1 | identifer of UPF |  |
| roamingChargingProfile | RoamingChargingProfile | OC | 0..1 | Roaming Charging Profile associated to the PDU session for roaming QBC. |  |

###### 6.1.6.2.2.14 Type MultipleQFIcontainer

Table 6.1.6.2.1.14-1: Definition of type MultipleQFIcontainer

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| triggers | array (Trigger) | Oc | 0..N | This field holds reason for closing the QFI unit container. |  |
| triggerTimestamp | DateTime | Oc | 0..1 | This field holds the UTC time indicating timestamp when the reporting trigger occur. |  |
| time | Uint32 | OC | 0..1 | This field holds the amount of time. |  |
| totalVolume | Uint64 | OC | 0..1 | This field holds the amount of volume in both uplink and downlink directions. |  |
| uplinkVolume | Uint64 | OC | 0..1 | This field holds the amount of volume in uplink direction. |  |
| downlinkVolume | Uint64 | OC | 0..1 | This field holds the amount of volume in downlink direction. |  |
| localSequenceNumber | integer | M | 1 | QFI data container sequence number. It starts from 1 and increased by 1 for each container generation |  |
| qFIContainerInformation | QFIContainerInformation | OC | 0..1 | This field holds the QFI data container information |  |

###### 6.1.6.2.2.15 Type RoamingChargingProfile

Table 6.1.6.2.1.15-1: Definition of type RoamingChargingProfile

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| triggers | array(Trigger) | OC | 0..N | Trigger for roaming QBC |  |
| partialRecordMethod | PartialRecordMethod | Oc | 0..1 | method uses for partial record closure |  |

###### 6.1.6.2.2.16 Type QFIContainerInformation

Table 6.1.6.2.1.16-1: Definition of type QFIContainerInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| qFI | Qfi | OM | 0..1 | QoS Flow Identifier (QFI) |  |
| reportTime | DateTime | M | 1 | the UTC time indicating time stamp when the QFI data container was closed |  |
| timeofFirstUsage | DateTime | OC | 0..1 | the UTC time indicating time stamp for the first IP packet to be transmitted and mapped to the QFI container |  |
| timeofLastUsage | DateTime | OC | 0..1 | the UTC time indicating time stamp for the last IP packet to be transmitted and mapped to the QFI container. |  |
| qoSInformation | QoSData | OC | 0..1 | the QoS applied to QFI container.  In case gbrUl or gbrDl are present for GBR QoS flow, the GBR targets are "GUARANTEED", otherwise, are " NOT\_GUARANTEED". |  |
| qoSCharacteristics | QosCharacteristics | OC | 0..1 | Map of QoS characteristics for non standard 5QIs and non-preconfigured 5Qis. |  |
| userLocationInformation | UserLocation | OC | 0..1 | provides information on the location |  |
| uetimeZone | TimeZone | OC | 0..1 | UE Time Zone the UE is currently located |  |
| presenceReportingAreaInformation | map(PresenceInfo) | OC | 0..N | the Presence Reporting Area status of UE during the QFI container interval. |  |
| rATType | RatType | OC | 0..1 | the RAT Type of the used unit |  |
| servingNetworkFunctionID | array(ServingNetworkFunctionI) | OC | 0..N | the list of serving Node Identifiers during the used QFI container interval. |  |
| 3gppPSDataOffStatus | 3GPPPSDataOffStatus | OC | 0..1 | the 3GPP Data off Status during the QFI container interval. |  |
| 3gppChargingId | ChargingId | OC | 0..1 | IP-CAN bearer Charging identifier used to identify this IP-CAN bearer in different records created by PGW-C+SMF.  Charging Id is generated by P-GW at IP-CAN bearer activation and is included in all containers in order to identify the containers which pertain to the IP-CAN bearer.  Only applicable for 5GS and EPS interworking. | 5GIEPC\_CH |
| diagnostics | Diagnostics | OC | 0..1 | provides a more detailed cause value for the release.  Only applicable for 5GS and EPS interworking. | 5GIEPC\_CH |
| enhancedDiagnostics | array(string) | OC | 0..N | provides a set of causes for the release  Only applicable for 5GS and EPS interworking. | 5GIEPC\_CH |

Editor’s Note: the diagnostics for interworking is ffs.

###### 6.1.6.2.2.17 Type RANSecondaryRATUsageReport

Table 6.1.6.2.2.17-1: Definition of type RANSecondaryRATUsageReport

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| rANSecondaryRATType | RatType | OM | 0..1 | RAT type associated to the reported usage on secondary RAT.  The following values are applicable:  - "NR"  - "EUTRA" |  |
| qosFlowsUsage Reports | Array(QosFlowsUsageReport) | OM | 0..N | list of containers per QFI with volumes reported. |  |

###### 6.1.6.2.2.18 Type QosFlowsUsageReport

Table 6.1.6.2.2.18-1: Definition of type QosFlowsUsageReport

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| qFI | Qfi | OM | 0..1 | QoS Flow Identifier (QFI) |  |
| startTimestamp | DateTime | OC | 0..1 | Start time of the reported usage |  |
| endTimestamp | DateTime | OC | 0..1 | End time of the reported usage |  |
| downlinkVolume | Uint64 | OC | 0..1 | Amount of volume in downlink direction. |  |
| uplinkVolume | Uint64 | OC | 0..1 | Amount of volume in uplink direction. |  |

###### 6.1.6.2.2.19 Type MAPDUSessionInformation

Table 6.1.6.2.2.19-1: Definition of MAPDUSessionInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| mAPDUSessionIndicator | MaPduIndication | OC | 0..1 | MA PDU session indication, i.e., MA PDU Request or MA PDU Network-Upgrade Allowed. | ATSSS |
| aTSSSCapability | AtsssCapability | OC | 0..1 | ATSSS capability | ATSSS |

###### 6.1.6.2.2.20 Type EnhancedDiagnostics5G

Table 6.1.6.2.2.19-1: Definition of EnhancedDiagnostics5G

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| ranNasCauseList | array(RanNasRelCause) | OM | 0..1 | List of the RAN or NAS release cause code information. | EnhancedDiagnostics |

##### 6.1.6.2.3 SMS Specified Data Type

###### 6.1.6.2.3.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.3.1 for SMS charging described in 3GPP TS 32.274[28].

Table 6.1.6.2.3.1-1: SMS Specified attribute of type ChargingDataRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| sMSCharging Information | SMSChargingInformation | OM | 0..1 | This field holds the SMSspecific information. |  |

###### 6.1.6.2.3.2 Type SMSChargingInformation

Table  6.1.6.2.2.3-2: Definition of type SMSChargingInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| originatorInfo | OriginatorInfo | OM | 0..1 | originator of the SM |  |
| recipientInfo | Array(RecipientInfo) | OC | 0..N | recipient information for the SM |  |
| userEquipment Info | Pei | OC | 0..1 | the identification of the terminal |  |
| roamerInOut | RoamerInOut | OC | 0..1 | In-bound or Out-bound roamer |  |
| userLocationInfo | UserLocation | OC | 0..1 | provides information on the location |  |
| uetimeZone | TimeZone | OC | 0..1 | the UE Time Zone the UE is currently located |  |
| rATType | RatType | OC | 0..1 | The identification of the RAT type. |  |
| sMSCAddress | string | OM | 0..1 | the address (e.g. E.164) of the SMS-service centre sending the Charging Data Request used for producing the record. (SMSC Address) |  |
| sMDataCodingScheme | integer | OM | 0..1 | the data coding scheme used within the SM. The information to populate this field is obtained from TP-DCS header. |  |
| sMMessageType | SMmessageType | OM | 0..1 | identifies the message that triggered the generation of charging information. |  |
| sMReplyPathRequested | ReplyPathRequested | OC | 0..1 | an indication of whether a reply SM to an original SM was requested to follow the same path as identified by the TP-Reply-Path (TP-RP) flag. |  |
| sMUserDataHeader | string | OC | 0..1 | carries the user data header extracted from the user data of the SM. The user data header (TP-UDH) is specified in TS 23.040 [x]. |  |
| sMStatus | string | OC | 0..1 | the information from the TP-Status field in a Status-Report TPDU.  It carries the value in hexadecimal representation  Pattern: '^[0-7]?[0-9a-fA-F]$' |  |
| sMDischargeTime | DateTime | OC | 0..1 | the time associated with the event being reported in the SM Status field. This information is only applicable to delivery report charging procedures. |  |
| numberofMessagesSent | Uint32 | OC | 0..1 | the number of SMSs sent by the IMS application or the total number of short messages when this SM is part of concatenated short message, if applicable. |  |
| sMServiceType | SMServiceType | OC | 0..1 | the type of SM service that caused the charging interaction. It is only applicable for SM supplementary service procedures. |  |
| sMSequenceNumber | Uint32 | OC | 0..1 | the sequence number of this SM within the concatenated short message |  |
| sMSresult | Uint32 | C | 0..1 | the result of the attempted SM transaction, if unsuccessful.  This field is only for offline charging. |  |
| submissionTime | DateTime | OC | 0..1 | the timestamp of when the submitted SM arrived at the originating SMS Node |  |
| sMpriority | SMPriority | OC | 0..1 | any priority information associated with an SM |  |
| messageReference | string | OM | 0..1 | the identity used to identify an SM in the SMS node associated with entity that submitted it |  |
| messageSize | Uint32 | OM | 0..1 | the total number of short messages when this SM is part of concatenated short message |  |
| messageClass | MessageClass | OM | 0..1 | implementation dependent the value selected for a specific transaction. |  |
| deliveryReportRequested | DeliveryReportRequested | OC | 0..1 | indicates whether a delivery report is requested by the SM originator |  |

###### 6.1.6.2.3.3 Type OriginatorInfo

Table  6.1.6.2.3.3-1: Definition of type OriginatorInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| originatorSUPI | supi | OM | 0..1 | SUPI of the originator of the SMS |  |
| originatorGPSI | gpsi | O**C** | 0..1 | GPSI of the originator of the SMS |  |
| originatorOtherAddress | SMAddressInfo | OM | 0..1 | the address of the recipient of the SM, when different from SUPI and GPSI |  |
| originatorReceivedAddress | SMAddressInfo | O**C** | 0..1 | original, unmodified address of the originator of the SM, as received by the SMS node, in case address manipulation (such as number plan corrections) have been applied in the SMS node. |  |
| originatorSCCP Address | string | O**C** | 0..1 | SCCP calling address used to receive the SM at the SMS node |  |
| sMOriginatorInterface | Interface | OM | 0..1 | Provide the information describing the interface on which the SM was received by the SMS node. |  |
| sMOriginatorProtocolId | string | O**C** | 0..1 | the protocol used for the SM by originator |  |

###### 6.1.6.2.3.4 Type RecipientInfo

Table  6.1.6.2.3.4-1: Definition of type RecipientInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| recipientSUPI | supi | OM | 0..1 | SUPI of the recipient of the SM, as received by the SMS Node |  |
| recipientGPSI | gpsi | O**C** | 0..1 | GPSI of the recipient of the SM, as received by the SMS Node |  |
| recipientOtherAddress | Array(recipientAddress) | OC | 0..N | the address of the recipient of the SM, as received by the SMS Node, when different from SUPI and GPSI |  |
| recipientReceivedAddress | Array(SMAddressInfo) | OC | 0..N | original, unmodified address of the recipient of the SM, as received by the SMS node, in case address manipulation (such as number plan corrections) have been applied in the SMS node. |  |
| recipientSCCPAddress | string | OC | 0..1 | SCCP called address used by the SMS node to onward deliver the SM |  |
| sMDestinationInterface | SMInterface | OM | 0..1 | containing information describing the interface on which the SM was requested to be delivered |  |
| sMRecipientProtocolId | string | OC | 0..1 | holds the TP-PROTOCOL-ID (TP-PID) |  |

###### 6.1.6.2.3.5 Type SMAddressInfo

Table  6.1.6.2.3.5-1: Definition of type SMAddressInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| sMaddressType | SMAddressType | OC | 0..1 | the type of address carried |  |
| sMaddressData | string | OC | 0..1 | the address information and formatted according type of address |  |
| sMaddressDomain | SMAddressDomain | OC | 0..1 | the domain/network to which the associated address resides |  |

###### 6.1.6.2.3.6 Type RecipientAddress

Table  6.1.6.2.3.6-1: Definition of type RecipientAddress

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| recipientAddressInfo | SMAddressInfo | OC | 0..1 | indicates the type of address carried |  |
| sMaddresseeType | SMAddresseeType | OC | 0..1 | identifies the how the recipient is addressed in the header of an MM |  |

###### 6.1.6.2.3.7 Type MessageClass

Table  6.1.6.2.3.7-1: Definition of type MessageClass

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| classIdentifier | ClassIdentifier | OC | 0..1 | indicate the class identifier |  |
| tokenText | string | OC | 0..1 | contains extension information |  |

###### 6.1.6.2.3.8 Type SMAddressDomain

Table  6.1.6.2.3.8-1: Definition of type SMAddressDomain

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| domainName | string | OC | 0..1 | represents a fully qualified domain name (FQDN). |  |
| 3GPPIMSIMCCMNC | string | OC | 0..1 | MCC and MNC extracted from the user’s IMSI (first 5 or 6 digits, as applicable from the presented IMSI. |  |

###### 6.1.6.2.3.9 Type SMInterface

Table  6.1.6.2.3.9-1: Definition of type SMInterface

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| interfaceId | string | OC | 0..1 | the interface identification provided by the messaging node (originator/destination). |  |
| interfaceText | string | OC | 0..1 | It is the consolidation information about the application associated with the charging event |  |
| interfacePort | string | OC | 0..1 | the port-identification or contains information about the transport layer port used by the application associated with the charging event |  |
| interfaceType | InterfaceType | OC | 0..1 | type of interface / nature of the transaction in the messaging node for which the charging event occurs |  |

##### 6.1.6.2.4 5G connection and mobility Specified Data Type

###### 6.1.6.2.4.1 Type ChargingDataRequest

This clause specifies additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for 5G connection and mobility described in 3GPP TS 32.256 [31].

Table 6.1.6.2.4.1-1: 5G connection and mobility Specified attribute of type ChargingDataRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| registrationChargingInformation | RegistrationChargingInformation | OM | 0..1 | This field holds the 5G registration specific information. |  |
| n2ConnectionChargingInformation | N2ConnectionChargingInformation | OM | 0..1 | This field holds the 5G N2 connection specific information. |  |
| locationReportingChargingInformation | LocationReportingChargingInformation | OM | 0..1 | This field holds the 5G Location reporting specific information. |  |

###### 6.1.6.2.4.2 Type ChargingDataResponse

This clause specifies additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 for 5G connection and mobility described in 3GPP TS 32.256 [31].

Table 6.1.6.2.4.2-1: 5G connection and mobility Specified attribute of type ChargingDataResponse

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| locationReportingChargingInformation | LocationReportingChargingInformation | OC | 0..1 | This field holds the 5G connection and mobility location reporting specific information | AMF\_subs\_PRA |

###### 6.1.6.2.4.3 Type RegistrationChargingInformation

Table 6.1.6.2.4.3-1: Definition of type RegistrationChargingInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| registrationMessagetype | RegistrationMessageType | M | 1 | Message type received by the AMF: registration (initial, initial, mobility, periodic, emergency), deregistration. |  |
| userInformation | UserInformation | OM | 0..1 | Includes information of user and user equipment |  |
| userLocationinfo | UserLocation | OC | 0..1 | Information on the location and location time |  |
| pSCellInformation | PSCellInformation | OC | 0..1 | Primary SCG (Secondary Cell Group) Cell |  |
| uetimeZone | TimeZone | OC | 0..1 | UE Timezone the UE is currently located |  |
| rATType | RatType | OC | 0..1 | RAT Type of the registration |  |
| 5gMMCapability | Bytes | OC | 0..1 | 5GMM capability IE as specified in clause 9.11.3.1 of 3GPP TS 24.501 [303] |  |
| mICOModeIndication | MICOModeIndication | OC | 0..1 | Indicates whether the requested use of MICO mode is accepted or not by the network |  |
| smsIndication | SmsIndication | OC | 0..1 | Indicates whether the SMS delivery over NAS is supported |  |
| taiList | array(Tai) | OC | 0..N | An array of TAIs representing the set of tracking areas composing the Registration Area. |  |
| serviceAreaRestriction | ServiceAreaRestriction | OC | 0..1 | Service Area Restriction for the UE. |  |
| requestedNSSAI | array(Snssai) | OC | 0..N | Requested NSSAI. |  |
| allowedNssai | array(Snssai) | OC | 0..N | Allowed NSSAI. |  |
| rejectedNSSAI | array(Snssai) | OC | 0..N | Rejected NSSAI. |  |
| nSSAIMapList | array(NSSAIMap) | OC | 0..N | Mapping of each S-NSSAI of the Allowed NSSAI to the S-NSSAIs of the Subscribed S-NSSAIs. |  |
| amfUeNgapId | integer | OM | 0..1 | UE association over the N2 interface within the AMF. |  |
| ranUeNgapId | integer | OM | 0..1 | RAN UE NGAP ID over N2 interface |  |
| ranNodeId | GlobalRanNodeId | OC | 0..1 | Identity of the RAN node. |  |

###### 6.1.6.2.4.4 Type N2ConnectionChargingInformation

Table 6.1.6.2.4.4-1: Definition of type N2ConnectionChargingInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| n2ConnectionMessageType | N2ConnectionMessageType | M | 1 | N2 message type received by the AMF specified in clause 9.7 3GPP TS 24.501 [303] |  |
| userInformation | UserInformation | OM | 0..1 | Includes information of user and user equipment |  |
| userLocationinfo | UserLocation | OC | 0..1 | Information on the location and location time |  |
| pSCellInformation | PSCellInformation | OC | 0..1 | Primary SCG (Secondary Cell Group) Cell |  |
| uetimeZone | TimeZone | OC | 0..1 | UE Timezone the UE is currently located |  |
| rATType | RatType | OC | 0..1 | RAT Type of the registration |  |
| amfUeNgapId | integer | OM | 0..1 | UE association over the N2 interface within the AMF. |  |
| ranUeNgapId | integer | OM | 0..1 | RAN UE NGAP ID over N2 interface |  |
| ranNodeId | GlobalRanNodeId | OC | 0..1 | Identity of the RAN node. |  |
| restrictedRatList | array(RatType) | OC | 0..N | List of RAT types that are restricted for the UE |  |
| forbiddenAreaList | array(Area) | OC | 0..N | List of forbidden areas for the UE |  |
| serviceAreaRestriction | ServiceAreaRestriction | OC | 0..1 | Service Area Restriction for the UE. |  |
| restrictedCnList | array(CoreNetworkType) | OC | 0..N | List of Core Network Types that are restricted for the UE |  |
| allowedNssai | array(Snssai) | OC | 0..N | Allowed NSSAI. |  |
| rrcEstCause | string | OC | 0..1 | RRC Establishment Cause, if received from the 5G-AN, specified in TS 38.413 [304], clause 9.3.1.111.  It carries the value in hexadecimal representation  Pattern: '^[0-9a-fA-F]+$' |  |

###### 6.1.6.2.4.5 Type LocationReportingChargingInformation

Table 6.1.6.2.4.5-1: Definition of type LocationReportingChargingInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| locationReportingMessageType | LocationReportingMessageType | M | 1 | Includes Location reporting message type |  |
| userInformation | UserInformation | OM | 0..1 | Includes information of user and user equipment |  |
| userLocationinfo | UserLocation | OM | 0..1 | Information on the location and location time |  |
| pSCellInformation | PSCellInformation | OC | 0..1 | Primary SCG (Secondary Cell Group) Cell |  |
| uetimeZone | TimeZone | OC | 0..1 | UE Timezone the UE is currently located |  |
| presenceReportingAreaInformation | map(PresenceInfo) | OC | 0..N | The Presence Reporting Area(s) and status of UE presence. |  |
| rATType | RatType | OC | 0..1 | RAT Type of the registration |  |

###### 6.1.6.2.4.6 Type: PSCellInformation

Table 6.1.6.2.4.6-1: Definition of type PSCellInformation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| nrcgi | Ncgi | Oc | 0..1 | NR Cell Identity |
| ecgi | Ecgi | Oc | 0..1 | E-UTRA Cell Identity |

###### 6.1.6.2.4.7 Type: NSSAIMap

Table 6.1.6.2.4.7-1: Definition of type NSSAIMap

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| servingSnssai | Snssai | M | 1 | S-NSSAI in the serving PLMN |
| homeSnssai | Snssai | M | 1 | S-NSSAI in home PLMN |

##### 6.1.6.2.5 Exposure Function Northbound API Specified Data Type

###### 6.1.6.2.5.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for Exposure Function Northbound API charging described in 3GPP TS 32.254[14].

Table 6.1.6.2.5.1-1: Exposure Function Northbound API Specified attribute of type ChargingDataRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| nEFCharging Information | NEFChargingInformation | OM | 0..1 | This field holds the Exposure Function Northbound API specific information. |  |

###### 6.1.6.2.5.1a Type ChargingDataResponse

This clause specifies additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 for Exposure Function Northbound API charging described in 3GPP TS 32.254[14].

Table 6.1.6.2.5.2-1: Exposure Function Northbound API Specified attribute of type ChargingDataResponse

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
|  |  |  |  |  |  |

###### 6.1.6.2.5.2 Type NEFChargingInformation

Table  6.1.6.2.5.3-2: Definition of type NEFChargingInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| externalIndividualIdentifier | Gpsi | OC | 0..N | The external Identifier or the MSISDN associated to the GPSI of the individual UE. |  |
| externalGroupIdentifier | ExternalGroupId | OC | 0.1 | The external Identifier identifying a group of individual UE(s). |  |
| groupIdentifier | GroupId | OC | 0..1 | The network internal globally unique Identifier identifying a set of IMSIs. |  |
| aPIDirection | APIDirection | M | 1 | The direction to indicate if it is an API invocation from an AF or notification to an AF. |  |
| aPITargetNetworkFunction | NfInstanceId | OC | 0..1 | The identifier of the network function that either is the destination of the API invocation or triggers the notification. |  |
| aPIResultCode | Uint32 | OC | 0..1 | The result of API Invocation. |  |
| aPIName | string | M | 1 | The name of the API invoked. |  |
| aPIReference | Uri | OC | 0..1 | The reference to the definition of the format of the API invocation. |  |
| aPIContent | string | OC | 0..1 | The actual content of the API invocation, in the format described by the aPIReference. |  |

##### 6.1.6.2.6 Network Slice Management (NSM) Specified Data Type

###### 6.1.6.2.6.1 Type ChargingDataRequest

This clause specifies additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.1.1 for Network Slice Management (NSM) charging described in 3GPP TS 28.202 [71].

Table 6.1.6.2.6.1-1: Network Slice Management (NSM) charging specified attribute of type ChargingDataRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| tenantIdentifier | string | OM | 0..1 | Identifier of the tenant |  |
| mnSConsumerIdentifier | string | OM | 0..1 | MnS consumer Identifier |  |
| nSMChargingInformation | NSMChargingInformation | OM | 0..1 | This field holds the Network Slice Management (NSM) specific information. |  |

###### 6.1.6.2.6.2 Type ChargingDataResponse

This clause specifies additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.1.2 Network Slice Management (NSM) charging described in 3GPP TS 28.202 [71].

Table 6.1.6.2.X.2-1: Network Slice Management (NSM) charging specified attribute of type ChargingDataResponse

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
|  |  |  |  |  |  |

###### 6.1.6.2.6.3 Type NSMChargingInformation

Table 6.1.6.2.6.3-1: Definition of type NSMChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
| --- | --- | --- | --- | --- | --- |
| managementOperation | ManagementOperation | M | 1 | Management operation associated to the provisioning specified in TS 28.532 [253]. |  |
| idNetworkSliceInstance | string | OM | 0..1 | Managed Object Instance (MOI) of NetworkSlice IOC.This is a full DN according to 3GPP TS 32.300 [255]. |  |
| listOfServiceProfileChargingInformation | Array (ServiceProfileChargingInformation) | OM | 0..N | List of Service profile charging information |  |
| managementOperationStatus | ManagementOperationStatus | OC | 0..1 | Status of the management operation |  |
| operationalState | OperationalState | OC | 0..1 | Operational state of the network slice instance |  |
| administrativeState | AdministrativeState | OC | 0..1 | Administrative state of the network slice instance |  |

###### 6.1.6.2.6.4 Type ServiceProfileChargingInformation

Table 6.1.6.2.6.4-1: Definition of type ServiceProfileChargingInformation

| Attribute name | Data type | P | Cardinality | Description | Applicability |
| --- | --- | --- | --- | --- | --- |
| serviceProfileIdentifier | string | OM | 0..1 | Described in TS 28.541 [254] clause 6.4 serviceProfileId attribute |  |
| sNSSAIList | array(Snssai) | OM | 0..N | List of S-NSSAI(s) |  |
| sST | Sst | OM | 0..1 | Described in TS 28.541 [254] clause 6.4 sST attribute |  |
| latency | integer | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 latency attribute |  |
| availability | number | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 availability attribute |  |
| resourceSharingLevel | SharingLevel | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 serviceProfile.resourceSharingLevel attribute |  |
| jitter | integer | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 jitter attribute |  |
| reliability | string | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 d reliability attribute |  |
| maxNumberofUEs | integer | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 maxNumberofUEs attribute |  |
| coverageArea | String | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 coverageArea attribute |  |
| uEMobilityLevel | MobilityLevel | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 uEMobilityLevel attribute |  |
| delayToleranceIndicator | Support | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 delayTolerance.support attribute |  |
| dLThptPerSlice | Throughput | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 dLThptPerSlice attribute |  |
| dLThptPerUE | Throughput | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 dLThptPerUE attribute |  |
| uLThptPerSlice | Throughput | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 uLThptPerSlic attribute |  |
| uLThptPerUE | Throughput | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 uLThptPerUE attribute |  |
| maxNumberofPDUsessions | integer | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 maxNumberofConns.nOofConn attribute |  |
| kPIMonitoringList | string | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 kPIMonitoring.kPIList attribute |  |
| supportedAccessTechnology | integer | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 SupportedAccessTech.accTechList attribute |  |
| v2XCommunicationModeIndicator | Support | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 V2XCommMode.v2XMode attribute |  |
| addServiceProfileChargingInfo | string | OC | 0..1 | This field contains additional attributes of the service profile. |  |

###### 6.1.6.2.6.5 Type Throughput

Table 6.1.6.2.6.5-1: Definition of type Throughput

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| guaranteedThpt | Float | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 guaThpt attribute |  |
| maximumThpt | Float | OC | 0..1 | Described in TS 28.541 [254] clause 6.4 maxThpt attribute |  |

##### 6.1.6.2.7 NS performance and analytics Specified Data Type

###### 6.1.6.2.7.1 Type ChargingDataRequest

This clause is additional attributes of the type ChargingDataRequest defined in clause 6.1.6.2.7.1 for NS performance and analytics charging described in 3GPP TS 28.201[201].

Table 6.1.6.2.7.1-1: NS performance and analytics Specified attribute of type ChargingDataRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| tenantIdentifier | string | OM | 0..1 | This field contains the identification of the subscriber of the network slice |  |
| nSPAChargingInformation | NSPAChargingInformation | OC | 0..1 | This field holds the network slice information, which is reported to the CHF |  |

###### 6.1.6.2.7.2 Type ChargingDataResponse

This clause is additional attributes of the type ChargingDataResponse defined in clause 6.1.6.2.7.2 for NS performance and analytics charging described in 3GPP TS 28.201[201].

Table 6.1.6.2.7.2-1: NS performance and analytics Specified attribute of type ChargingDataResponse

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
|  |  |  |  |  |  |

###### 6.1.6.2.7.3 Type UsedUnitContainer

This clause is additional portion of the type UsedUnitContainer defined in clause 6.1.6.2.1.10 for NS performance and analytics charging described in 3GPP TS 28.201[201].

Table 6.1.6.2.X.3-1: NS performance and analytics charging of type UsedUnitContainer

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| nSPAContainerInformation | NSPAContainerInformation | OC | 0..1 | the network slice performance and analytics container specific information. |  |

###### 6.1.6.2.7.4 Type NSPAChargingInformation

Table 6.1.6.2.7.4-1: Definition of type NSPAChargingInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| singleNSSAI | Snssai | M | 0..1 | This field holds single Network Slice Selection Assistance Information for performance reporting. |  |

###### 6.1.6.2.7.5 Type NSPAContainerInformation

Table 6.1.6.2.7.5-1: Definition of type NSPAContainerInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| latency | integer | OC | 0..1 | This field holds latency |  |
| throughput | Throughput | OC | 0..1 | This field holds throughput. |  |
| maximumPacketLossRate | string | OC | 0..1 | This field holds maximum packet loss rate. |  |
| serviceExperienceStatisticsData | ServiceExperienceInfo | OC | 0..1 | This field holds service experience statistics data. |  |
| theNumberOfPDUSessions | integer | OC | 0..1 | This field holds the number of PDU sessions. |  |
| theNumberOfRegisteredSubscribers | integer | OC | 0..1 | This field holds the number of registered subscribers. |  |
| loadLevel | NsiLoadLevelInfo | OC | 0..1 | This field holds the load level of network slice. |  |

#### 6.1.6.3 Simple data types and enumerations

##### 6.1.6.3.1 Introduction

This subclause defines simple data types and enumerations that can be referenced from data structures defined in the previous subclauses.

##### 6.1.6.3.2 Simple data types

The simple data types defined in table 6.1.6.3.2-1 shall be supported.

Table 6.1.6.3.2-1: Simple data types

|  |  |  |  |
| --- | --- | --- | --- |
| Type Name | Type Definition | Description | Applicability |
| Diagnostics | integer | A more detailed cause value from SMF |  |
| IPFilterRule | string | Filter rules corresponding to services |  |
| N2ConnectionMessageType | integer | N2 message type received by the AMF |  |
| LocationReportingMessageType | integer | Location reporting message type |  |

##### 6.1.6.3.3 Enumeration: NotificationType

Table 6.1.6.3.3-1: Enumeration NotificationType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| REAUTHORIZATION | This value is used to indicate re-authorization. |  |
| ABORT\_CHARGING | This value is used to indicate termination of charging for PDU session. |  |

##### 6.1.6.3.4 Enumeration: NodeFunctionality

Table 6.1.6.3.4-1: Enumeration NodeFunctionality

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| SMF | This field identifies that NF is a SMF. |  |
| AMF | This field identifies that NF is a AMF. |  |
| SMSF | This field identifies that NF service consumer is a SMSF. |  |
| PGW\_C\_SMF | This field identifies that NF is a PGW-C+SMF. |  |
| NEF | This field identifies that NF is a NEF. |  |
| SGW | This field identifies that node is an SGW, only applicable for interworking with EPC. |  |
| I\_SMF | This field identifies that node is an I-SMF, only applicable for PDU session served by SMF + I-SMF. | ETSUN |
| ePDG | This field identifies that node is an ePDG, only applicable for interworking with EPC/ePDG. | 5GIEPC\_CH |
| CEF | This field identifies that NF is a CEF. |  |
| MnS\_Producer | This field identifies that NF is a MnS Producer |  |

##### 6.1.6.3.5 Enumeration: ChargingCharacteristicsSelectionMode

Table 6.1.6.3.5-1: Enumeration ChargingCharacteristicsSelectionMode

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| HOME\_DEFAULT | the subscriber belongs to the same PLMN as the SMF |  |
| ROAMING\_DEFAULT | the subscriber belongs to same PLMN and the AMF belongs to a different PLMN |  |
| VISITING\_DEFAULT | the subscriber belongs to a different PLMN |  |

##### 6.1.6.3.6 Enumeration: TriggerType

Table 6.1.6.3.6-1: Enumeration TriggerType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| QUOTA\_THRESHOLD | the quota threshold has been reached |  |
| QHT | the quota holding time specified in a previous response has been hit (i.e. the quota has been unused for that period of time) |  |
| FINAL | a service normal termination has occurred. |  |
| QUOTA\_EXHAUSTED | the quota has been exhausted |  |
| VALIDITY\_TIME | the credit authorization lifetime provided from CHF has expired |  |
| OTHER\_QUOTA\_TYPE | usage reporting of the particular quota type indicated in the used unit container where it appears is that, for a multi-dimensional quota, one reached a trigger condition and the other quota is being reported. |  |
| FORCED\_REAUTHORISATION | a Server initiated re-authorization procedure, i.e. receipt of notify service operation |  |
| UNIT\_COUNT\_INACTIVITY\_TIMER | the unit count inactivity timer has expired |  |
| ABNORMAL\_RELEASE | a service abnormal termination has occurred. |  |
| QOS\_CHANGE | In request message, this value is used to indicate that QoS change has happened. Any of elements of QoSData may result in QoS change.  In response message, this value is used to indicate that a change of authorized QoS shall cause the service consumer to ask for a re-authorization of the associated quota. |  |
| VOLUME\_LIMIT | Volume limit has been reached. |  |
| TIME\_LIMIT | Time limit has been reached |  |
| EVENT\_LIMIT | Event limit has been reached |  |
| PLMN\_CHANGE | PLMN has been changed. |  |
| USER\_LOCATION\_CHANGE | In request message, this value is used to indicate that User location has been changed. The change in location information that triggered reporting is included.  In response message, this value is used to indicate that a change in the end user location shall cause the service consumer to ask for a re-authorization of the associated quota |  |
| RAT\_CHANGE | In request message, this value is used to indicate that RAT type has been changed.  In response message, this value is used to indicate that a change in the radio access technology shall cause the service consumer to ask for a re-authorization of the associated quota |  |
| SESSION\_AMBR\_CHANGE | In request message, this value is used to indicate that Session AMBR has been changed.  In response message, this value is used to indicate that a change in the session AMBR shall cause the service consumer to ask for a re-authorization of the associated quota. |  |
| GFBR\_GUARANTEED\_STATUS\_CHANGE | In request message,thisvalue is used to indicate that GFBR targets for the indicated SDFs are changed ("NOT\_GUARANTEED" or "GUARANTEED" again).  In response message, this value is used to indicate that a NF Consumer (CTF) needs to ensure requesting the notification from the access network and that a change in the GFBR targets shall cause the service consumer to ask for a re-authorization of the associated quota. |  |
| UE\_TIMEZONE\_CHANGE | In request message, this value is used to indicate that UE timezone has been changed.  In response message, this value is used to indicate that a change in the time zone where the end user is located shall cause the service consumer to ask for a re-authorization of the associated quota. |  |
| TARIFF\_TIME\_CHANGE | Tariff time change has happened. |  |
| MAX\_NUMBER\_OF\_CHANGES\_IN\_CHARGING\_CONDITIONS | Max number of change has been reached |  |
| MANAGEMENT\_INTERVENTION | Management intervention |  |
| CHANGE\_OF\_UE\_PRESENCE\_IN\_PRESENCE\_REPORTING\_AREA | In request message, this value is used to indicate that Change of UE presence in PRA has happened.  In response message, this value is used to indicate a request of reporting the event that the user enters/leaves the area(s) as indicated in the presenceReportingArea Attribute |  |
| CHANGE\_OF\_3GPP\_PS\_DATA\_OFF\_STATUS | In request message, this value is used to indicate that Change of 3GPP PS Data off status has happened.  In response message, this value is used to indicate that a change in the 3GPP PS Data off status shall cause the service consumer to ask for a re-authorization of the associated quota |  |
| SERVING\_NODE\_CHANGE | A serving node (e.g., AMF) change in the NF Consumer |  |
| REMOVAL\_OF\_UPF | A used UPF is removed |  |
| ADDITION\_OF\_UPF | A new UPF is added. |  |
| INSERTION\_OF\_ISMF | A new I-SMF is inserted | ETSUN |
| REMOVAL\_OF\_ISMF | A used I-SMF is removed | ETSUN |
| CHANGE\_OF\_ISMF | A used I-SMF is removed, and a new I-SMF is inserted | ETSUN |
| START\_OF\_SERVICE\_DATA\_FLOW | A Service Data Flow has started |  |
| HANDOVER\_CANCEL | The handover is cancelled. |  |
| HANDOVER\_START | The handover is start. |  |
| HANDOVER\_COMPLETE | The handover is completed. |  |
| ECGI\_CHANGE | In request message, this value is used to indicate that ECGI has been changed.  In response message, this value is used to indicate that a change in the end user location shall cause the service consumer to ask for a re-authorization of the associated quota | 5GIEPC\_CH |
| TAI\_CHANGE | In request message, this value is used to indicate that TAI has been changed.  In response message, this value is used to indicate that a change in the end user location shall cause the service consumer to ask for a re-authorization of the associated quota | 5GIEPC\_CH |
| ADDITION\_OF\_ACCESS | Addition of access to the MA PDU session | ATSSS |
| REMOVAL\_OF\_ACCESS | Removal of access to the MA PDU session | ATSSS |
| START\_OF\_SDF\_ADDITIONAL\_ACCESS | Start of service data flow on additional access in a MA PDU session | ATSSS |

##### 6.1.6.3.7 Enumeration: FinalUnitAction

Table 6.1.6.3.7-1: Enumeration FinalUnitAction

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| TERMINATE | The service consumer should terminate the service session. |  |
| REDIRECT | The service consumer should redirect the user to the address specified in the redirectServerAddress attribute. |  |
| RESTRICT\_ACCESS | The service consumer should restrict the user access according to the IP packet filters defined in the restrictionFilterRule attribute or  according to the IP packet filters identified by the filterId attribute. |  |

##### 6.1.6.3.8 Enumeration: RedirectAddressType

Table 6.1.6.3.8-1: Enumeration RedirectAddressType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| IPV4 | the redirect server address is IPV4. |  |
| IPV6 | the redirect server address is IPV6. |  |
| URL | the redirect server address is URL. |  |

##### 6.1.6.3.9 Enumeration: TriggerCategory

Table 6.1.6.3.9-1: Enumeration TriggerCategory

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| IMMEDIATE\_REPORT | chargeable events for which, when occurring, the charging data generated by the NF Consumer triggers a Charging Event towards the CHF. |  |
| DEFERRED\_REPORT | chargeable events for which, when occurring, the charging data generated by the NF Consumer, does not trigger a Charging Event towards the CHF . |  |

##### 6.1.6.3.10 Enumeration: QuotaManagementIndicator

Table 6.1.6.3.10-1: Enumeration QuotaManagementIndicator

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| ONLINE\_CHARGING | quota management control |  |
| OFFLINE\_CHARGING | without quota management control |  |
| QUOTA\_MANAGEMENT\_SUSPENDED | quota management control suspended | CHFCQM |

##### 6.1.6.3.11 Enumeration: FailureHandling

Table 6.1.6.3.11-1: Enumeration FailureHandling

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| TERMINATE | the service shall only be granted for as long as there is a connection between NF consumer and the CHF. |  |
| CONTINUE | the NF consumer should re-send and continue the request to an alternative server in the case of transport temporary failures, provided that a failover procedure is supported in the CHF and the NF consumer, and that an alternative server is available. Otherwise, the service SHOULD be granted, even if charging data request can't be delivered. |  |
| RETRY\_AND\_TERMINATE | the NF consumer should re-send the  request to an alternative server in the case of transport temporary failures, provided that a failover procedure is supported in the CHF and NF consumer, and that an alternative server is available. Otherwise, the service should not be granted when the charging data request can't be delivered. |  |

##### 6.1.6.3.12 Enumeration: SessionFailover

Table 6.1.6.3.12-1: Enumeration SessionFailover

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| FAILOVER\_NOT\_SUPPORTED | The Nchf\_ConvergedCharging messages could not be moved to an alternative destination in the case of communication failure.  This is the default behaviour if the attribute is not present in the response. |  |
| FAILOVER\_SUPPORTED | The Nchf\_ConvergedCharging messages should be moved to an alternative destination in the case of communication failure. |  |

##### 6.1.6.3.13 Enumeration: 3GPPPSDataOffStatus

Table 6.1.6.3.13-1: Enumeration 3GPPPSDataOffStatus

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| ACTIVE | 3GPP PS data off status is active. |  |
| INACTIVE | 3GPP PS data off status is inactive. |  |

##### 6.1.6.3.14 Enumeration: ResultCode

Table 6.1.6.3.14-1: Enumeration ResultCode

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| SUCCESS | The CHF grants the service to the end-user.  This applies to the rating group. |  |
| END\_USER\_SERVICE\_DENIED | The CHF denies the service request due to end-user service restrictions or limitations related to the end-user. If the request contained used units they shall be deducted, if applicable.  This applies to the rating group. |  |
| QUOTA\_MANAGEMENT\_NOT\_APPLICABLE | The CHF determines that the service can be granted to the end user without quota management control and used units shall be reported.  This applies to the rating group. |  |
| QUOTA\_LIMIT\_REACHED | The CHF denies the service request since the end user's account could not cover the requested service. If the request contained used units they shall be deducted, if applicable.  This applies to the rating group. |  |
| END\_USER\_SERVICE\_REJECTED | The CHF denies the service request in order to terminate the service for which credit is requested.  This applies to the rating group. |  |
| RATING\_FAILED | The CHF determines that the service cannot be rated due to insufficient rating input, incorrect parameter combination or unrecognized parameter, or parameter value.  This applies to the rating group. |  |
| QUOTA\_MANAGEMENT | The CHF determines that the quota management control can temporarily be suspended.  This applies to the rating group. | CHFCQM |

##### 6.1.6.3.15 Enumeration: PartialRecordMethod

Table 6.1.6.3.15-1: Enumeration PartialRecordMethod

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| DEFAULT | Default method used for partial records |  |
| INDIVIDUAL | Individual methods used for partial records |  |

##### 6.1.6.3.16 Enumeration: RoamerInOut

The enumeration RoamerInOut indicates whether the user is an in-bound or out-bound roamer.

Table 6.1.6.3.16-1: Enumeration RoamerInOut

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| IN\_BOUND | In-bound roamer. |  |
| OUT\_BOUND | Out-bound roamer. |  |

##### 6.1.6.3.17 Void

##### 6.1.6.3.18 Enumeration: SMMessageType

Table 6.1.6.3.18-1: Enumeration SMMessageType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| SUBMISSION | The SMS message type is submission. |  |
| DELIVERY\_REPORT | The SMS message type is delivery report. |  |
| SM\_SERVICE\_REQUEST | The SMS message type is SMS service request. |  |
| DELIVERY | The SMS message type is delivery or “to deliver” |  |

##### 6.1.6.3.19 Enumeration: SMPriority

Table 6.1.6.3.19-1: Enumeration SMPriority

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| LOW | low priority |  |
| NORMAL | normal priority |  |
| HIGH | high priority |  |

##### 6.1.6.3.20 Enumeration: DeliveryReportRequested

Table 6.1.6.3.20-1: Enumeration DeliveryReportRequested

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| YES | Delivey report is requested. |  |
| NO | The delivery report is not requested. |  |

##### 6.1.6.3.21 Enumeration: InterfaceType

Table 6.1.6.3.21-1: Enumeration InterfaceType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| UNKNOWN | Interface type is unknown, |  |
| MOBILE\_ORIGINATING | Interface type is mobile originated. |  |
| MOBILE\_TERMINATING | Interface type is mobile terminated. |  |
| APPLICATION\_ORIGINATING | Interface type is application originated. |  |
| APPLICATION\_TERMINATION | Interface type is application terminated. |  |

##### 6.1.6.3.22 Enumeration: ClassIdentifier

Table 6.1.6.3.22-1: Enumeration ClassIdentifier

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| PERSONAL | The class identifier is personal. |  |
| ADVERTISEMENT | The class identifier is advertisement. |  |
| INFORMATIONAL | The class identifier is informational. |  |
| AUTO | The class identifier is auto. |  |

##### 6.1.6.3.23 Enumeration: SMAddressType

Table 6.1.6.3.23-1: Enumeration SMAddressType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| EMAIL\_ADDRESS | The carried address type is EMAIL. |  |
| MSISDN | The carried address type is MSISDN. |  |
| IPV4\_ ADDRESS | The carried address type is IPv4. |  |
| IPV6\_ ADDRESS | The carried address type is IPv6. |  |
| NUMERIC\_SHORTCODE | The carried address type is numeric shortcode. |  |
| ALPHANUMERIC\_SHORTCODE | The carried address type is alphanumeric shortcode. |  |
| OTHER | The carried address type is other. |  |
| IMSI | The carried address type is IMSI |  |

##### 6.1.6.3.24 Enumeration: SMAddresseeType

Table 6.1.6.3.24-1: Enumeration SMAddresseeType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| TO | The addressee type is TO. |  |
| CC | The addressee type is CC. |  |
| BCC | The addressee type is BCC. |  |

##### 6.1.6.3.25 Enumeration: SMServiceType

Table 6.1.6.3.25-1: Enumeration SMServiceType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| VAS4SMS\_SHORT\_MESSAGE\_CONTENT\_PROCESSING | The type of SM service is VAS4SMS short message content processing. |  |
| VAS4SMS\_SHORT\_MESSAGE\_FORWARDING | The type of SM service is VAS4SMS short message forwarding. |  |
| VAS4SMS\_SHORT\_MESSAGE\_FORWARDING \_MULTIPLE\_SUBSCRIPTIONS | The type of SM service is VAS4SMS short message forwarding multiple subscriptions. |  |
| VAS4SMS\_SHORT\_MESSAGE\_FILTERING | The type of SM service is VAS4SMS short message filtering. |  |
| VAS4SMS\_SHORT\_MESSAGE\_RECEIPT | The type of SM service is VAS4SMS short message receipt. |  |
| VAS4SMS\_SHORT\_MESSAGE\_NETWORK\_STORAGE | The type of SM service is VAS4SMS short message network storage. |  |
| VAS4SMS\_SHORT\_MESSAGE\_TO\_MULTIPLE\_DESTINATIONS | The type of SM service is VAS4SMS short message to multiple destinations. |  |
| VAS4SMS\_SHORT\_MESSAGE\_VIRTUAL\_PRIVATE\_NETWORK(VPN) | The type of SM service is VAS4SMS short message virtual private network. |  |
| VAS4SMS\_SHORT\_MESSAGE\_AUTO\_REPLY | The type of SM service is VAS4SMS short message auto reply. |  |
| VAS4SMS\_SHORT\_MESSAGE\_PERSONAL\_SIGNATURE | The type of SM service is VAS4SMS short message personal signature. |  |
| VAS4SMS\_SHORT\_MESSAGE\_DEFERRED\_DELIVERY | The type of SM service is VAS4SMS short message deferred delivery. |  |

##### 6.1.6.3.26 Enumeration: ReplyPathRequested

Table 6.1.6.3.26-1: Enumeration ReplyPathRequested

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| NO\_REPLY\_PATH\_SET | The reply SM to an original SM was requested to follow the same path. |  |
| REPLY\_PATH\_SET | The reply SM to an original SM was not requested to follow the same path. |  |

##### 6.1.6.3.27 Enumeration: DnnSelectionMode

Table 6.1.6.3.27-1: Enumeration DnnSelectionMode

|  |  |
| --- | --- |
| Enumeration value | Description |
| "VERIFIED" | UE or network provided DNN, subscription verified |
| "UE\_DNN\_NOT\_VERIFIED" | UE provided DNN, subscription not verified |
| "NW\_DNN\_NOT\_VERIFIED" | Network provided DNN, subscription not verified |

##### 6.1.6.3.28 Enumeration: EventType

**Table 6.1.6.3.28-1: Enumeration EventType**

|  |  |  |
| --- | --- | --- |
| **Enumeration value** | **Description** | **Applicability** |
| IEC | This value is used to indicate immediate event charging. |  |
| PEC | This value is used to indicate post event charging. |  |

##### 6.1.6.3.29 Enumeration: MICOModeIndication

Table 6.1.6.3.29-1: Enumeration MICOModeIndication

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| "MICO\_MODE" | MICO Mode used |  |
| "NO\_MICO\_MODE" | MICO Mode not used |  |

##### 6.1.6.3.30 Enumeration: RegistrationMessageType

Table 6.1.6.3.30-1: Enumeration RegistrationMessageType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| "INITIAL" | Initial registration |  |
| "MOBILITY" | Mobility registration update |  |
| "PERIODIC" | Periodic registration update |  |
| "EMERGENCY" | Emergency registration |  |
| "DEREGISTRATION" | Deregistration |  |

##### 6.1.6.3.31 Enumeration: SmsIndication

Table 6.1.6.3.31-1: Enumeration SmsIndication

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| "SMS\_SUPPORTED" | SMS over NAS is supported |  |
| "SMS\_NOT\_SUPPORTED" | SMS over NAS is Not supported |  |

##### 6.1.6.3.32 Enumeration: APIDirection

Table 6.1.6.3.32-1: Enumeration APIDirection

|  |  |  |
| --- | --- | --- |
| **Enumeration value** | **Description** | **Applicability** |
| INVOCATION | Indicates an API invocation from an AF. |  |
| NOTIFICATION | Indicates a notification to an AF. |  |

##### 6.1.6.3.33 Enumeration: ManagementOperation

Table 6.1.6.3.33-1: Enumeration ManagementOperation

|  |  |  |
| --- | --- | --- |
| **Enumeration value** | **Description** | **Applicability** |
| CREATE\_MOI | createMOI management operation |  |
| MODIFY\_MOI\_ATTR | modifyMOIAttributes management operation |  |
| DELETE\_MOI | deleteMOI management operation |  |

##### 6.1.6.3.34 Enumeration: ManagementOperationStatus

Table 6.1.6.3.34-1: Enumeration ManagementOperationStatus

|  |  |  |
| --- | --- | --- |
| **Enumeration value** | **Description** | **Applicability** |
| OPERATION\_SUCCEEDED | Management operation succeeded |  |
| OPERATION\_FAILED | Management operation failed |  |

#### 6.1.6.4 Data types describing alternative data types or combinations of data types

None.

#### 6.1.6.5 Binary data

None.

### 6.1.7 Error handling

#### 6.1.7.1 General

HTTP error handling shall be supported as specified in subclause 5.2.4 of 3GPP TS 29.500 [299].

For the Nchf\_ConvergedCharging API, HTTP error responses shall be supported as specified in subclause 4.8 of 3GPP TS 29.501 [2]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [299] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [299]. In addition, the requirements in the following subclauses shall apply.

#### 6.1.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the Nchf\_ConvergedCharging API compared to the Protocol Error Handling specified in subclause 5.2.7.2 of 3GPP TS 29.500 [299].

#### 6.1.7.3 Application errors

The application errors defined for the Nchf\_ConvergedCharging API are listed in table 6.1.7.3-1. The CHF shall include in the HTTP status code a "ProblemDetails" data structure with the "cause" attribute indicating the application error as listed in table 6.1.7.3-1. The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [299] may also be used for the Nchf\_ConvergedCharging service.

Table 6.1.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| CHARGING\_FAILED | 400 Bad Request | The HTTP request is rejected because the set of session or subscriber information needed by the CHF for charging or CDR creation is incomplete or erroneous or not available. (E.g. Rating Group, subscriber information) |
| RE\_AUTHORIZATION\_FAILED | 400 Bad Request | The HTTP request is rejected because the set of information needed by the NF Consumer (CTF) to report the usage is incomplete or erroneous or not available. |
| CHARGING\_NOT\_APPLICABLE | 403 Forbidden | The HTTP request is rejected by the CHF since it has been determined that the service can be allowed to the end user without any charging or CDR creation. |
| USER\_UNKNOWN | 404 Not Found | The HTTP request is rejected because the end user specified in the request cannot be served by the CHF. |
| END\_USER REQUEST\_DENIED | 403 Forbidden | The HTTP request denied by the CHF due to restrictions or limitations related to the end-user. |
| QUOTA\_LIMIT\_REACHED | 403 Forbidden | The HTTP request denied by the CHF because the end user's account could not cover the requested service. If the request contained used units they are deducted, if applicable. |
| END\_USER\_REQUEST\_REJECTED | 403 Forbidden | The HTTP request rejected by the CHF due to end-user restrictions or limitations. |

### 6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the Nchf\_ConvergedCharging API. They shall be negotiated using the extensibility mechanism defined in subclause 6.6 of 3GPP TS 29.500 [299].

Table 6.1.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | CHFCQM | CHF-controlled quota management i.e. support for temporary offline |
| 2 | AF\_Charging\_Identifier | Indicates the support of long character strings as charging identifiers. |
| 3 | 5GIEPC\_CH | 5GS interworking with EPC |
| 4 | ATSSS | This feature indicates support of Access Traffic Steering, Switching, Splitting (ATSSS). |
| 5 | ETSUN | This feature indicates support of Enhancing Topology of SMF and UPF in 5G Networks (ETSUN). |
| 6 | EnhancedDiagnostics | Support the enhanced diagnostics |
| 7 | AMF\_subs\_PRA | PRA(s) subscription by CHF in AMF |

### 6.1.9 Usage of general functionalities in SBA

#### 6.1.9.1 General

The functionalities specified for Service Based Architecture in clause 6 of TS 29.500 [299], may be supported. Any deviation from or special usage of the specified functionalities are described in this clause.

#### 6.1.9.2 Extensibility Mechanisms

The information elements sent on the Nchf\_ConvergedCharging API can be extensible with vendor-specific data.

The only JSON data types that can be extended, by defining additional members, are JSON objects; simple data types (and arrays of items of simple data types) cannot be extended in this way. The charging vendor-specific extensions use the extensibility mechanism defined in clause 6.6 of TS 29.500 [299].

## 6.2 Nchf\_ OfflineOnlyCharging Service API

### 6.2.1 Introduction

The APIs defined in this clause implement the service operation defined in clause 5.3.2.

The Nchf\_OfflineOnlyCharging service shall use the Nchf\_OfflineOnlyCharging API.

The request URI used in each HTTP request from the NF service consumer towards the CHF shall have the structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

**{apiRoot}/{apiName}/{apiVersion}/{apiSpecificResourceUriPart}**

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The {apiName} shall be "Nchf\_OfflineOnlyCharging".

- The {apiVersion} shall be "v1".

- The {apiSpecificResourceUriPart} shall be set as described in clause 6.2.3.

### 6.2.2 Usage of HTTP

See clause 6.1.2 in this document.

### 6.2.3 Resources

#### 6.2.3.1 Overview



Figure 6.2.3.1-1: Resource URI structure of the Nchf\_OfflineOnlyCharging API

Offline Only Charging Data Ref is a unique identifier for an offline only charging data resource in a PLMN. It’s created in CHF when CHF receives a Nchf\_ OfflineOnlyCharging\_Create request and provided to NF (CTF) in the Location header field in the Nchf\_ OfflineOnlyCharging\_Create response. The NF (CTF) shall use the Offline Only Charging Data Ref received in subsequent requests to the CHF for the same charging data resource.

Table 6.2.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.2.3.1-1: Resources and methods overview

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method or custom operation | Description | Corresponding service operation |
| Offline Only Charging Data | {apiRoot}/ nchf-offlineonlycharging/ {apiVersion}/offlinechargingdata | POST | Create a new Offline Only Charging Data resource | Nchf\_OfflineOnlyCharging\_Create |
| Individual Offline Only Charging Data | {apiRoot}/ nchf-offlineonlycharging/{apiVersion}/ offlinechargingdata/{OfflineChargingDataRef }/update | update  (POST) | Update an existing Offline Only Charging Data resource. | Nchf\_OfflineOnlyCharging\_Update |
| {apiRoot}/ nchfofflineonlycharging/v1/ offlinechargingdata /{OfflineChargingDataRef}/release | release  (POST) | Update and release an existing Offline Only Charging Data resource. | Nchf\_OfflineOnlyCharging\_Release |

#### 6.2.3.2 Resource: Charging Data

##### 6.2.3.2.1 Description

Offline Only Charging Data resource represents a collection of the different offline only charging data resources created by the CHF for offline only charging as defined in 3GPP TS 32.290 [58].

##### 6.2.3.2.2 Resource Definition

Resource URI: **{apiRoot}/nchf-offlineonlycharging/v1/offlinechargingdata**

This resource shall support the resource URI variables defined in table 6.2.3.2.2-1.

Table 6.2.3.2.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.2.1 |

##### 6.2.3.2.3 Resource Standard Methods

###### 6.2.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.2.3.2.3.1-1.

Table 6.2.3.2.3.1-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| n/a |  |  |  |  |

This method shall support the request data structures specified in table 6.2.3.2.3.1-2 and the response data structures and response codes specified in table 6.2.3.2.3.1-3.

Table 6.2.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| ChargingDataRequest | M | 1 | Parameters to create a new Offline Only Charging Data resource. |

Table 6.2.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| ChargingDataResponse | M | 1 | 201 Created | The creation of an Offline Only Charging Data resource is confirmed and a representation of that resource is returned.  The Offline Only Charging Data resource which is created and returned successfully. The representation of created resource is identified via Location header field in the 201 response. |
|  |  |  | 307 Temporary Redirect | (NOTE 2) |
| ChargingDataResponse | M | 1 | 400  Bad Request | (NOTE 2) |
| ChargingDataResponse | M | 1 | 403  Forbidden | (NOTE 2) |
| ChargingDataResponse | M | 1 | 404  Not Found | (NOTE 2) |
|  | M | 1 | 405  Method Not Allowed | (NOTE 2) |
|  | M | 1 | 408  Request Timeout | (NOTE 2) |
|  | M | 1 | 500  Internal Server Error | (NOTE 2) |
|  | M | 1 | 503  Service Unavailable | (NOTE 2) |
|  | M | 1 | 508  Gateway  Timeout | (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply.  NOTE 2: Failure cases are described in clause 6.2.7. | | | | |

##### 6.2.3.2.4 Resource Custom Operations

None.

#### 6.2.3.3 Resource: Individual Offline Only Charging Data

##### 6.2.3.3.1 Description

Individual Offline Only Charging Data resource represents an offline only charging data resource created in the CHF.

##### 6.2.3.3.2 Resource Definition

Resource URI: **{apiRoot}/nchf-offlineonlycharging/v1/offlinechargingdata/{OfflineChargingDataRef}**

This resource shall support the resource URI variables defined in table 6.2.3.3.2-1.

Table 6.2.3.3.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.2.1 |
| OfflineChargingDataRef | Offline only charging data resource reference assigned by the CHF during the Nchf\_ OfflineOnlyCharging\_Create operation, |

##### 6.2.3.3.3 Resource Standard Methods

None.

##### 6.2.3.3.4 Resource Custom Operations

###### 6.2.3.3.4.1 Overview

Table 6.2.3.3.4.1-1: Custom operations

|  |  |  |
| --- | --- | --- |
| Custom operation URI | Mapped HTTP method | Description |
| {apiRoot}/ nchf-offlineonlyncharging/v1/ offlinechargingdata/{OfflineChargingDataRef }/update | POST | Update an existing Offline Only Charging Data resource. |
| {apiRoot}/ nchf-offlinecharging/v1/ offlinechargingdata /{OfflineChargingDataRef}/release | POST | Update and release an existing Offline Only Charging Data resource. |

###### 6.2.3.3.4.2 Operation: update

6.2.3.3.4.2.1 Description

This operation updates an existing Offline Only Charging Data resource.

6.2.3.3.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.2.3.3.4.2.2-1 and the response data structures and response codes specified in table 6.2.3.3.4.2.2-2.

Table 6.2.3.3.4.2.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| ChargingDataRequest | M | 1 | Parameters to modify an existing Offline Only Charging Data resource matching the OfflineChargingDataRef according to the representation in the OfflineChargingData.  The request URI is the representation in the Location header field in the 201 response of resource creation. |

Table 6.2.3.3.4.2.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| ChargingDataResponse | M | 1 | 200 OK | The modification of an Offline Only Charging Data resource is confirmed and a representation of that resource is returned.  The Offline Only Charging Data resource which is modified and returned successfully. |
|  |  |  | 307 Temporary Redirect | (NOTE 2) |
| ChargingDataResponse | M | 1 | 400  Bad Request | (NOTE 2) |
| ChargingDataResponse | M | 1 | 403  Forbidden | (NOTE 2) |
| ChargingDataResponse | M | 1 | 404  Not Found | (NOTE 2) |
|  | M | 1 | 405  Method Not Allowed | (NOTE 2) |
|  | M | 1 | 408  Request Timeout | (NOTE 2) |
|  | M | 1 | 500  Internal Server Error | (NOTE 2) |
|  | M | 1 | 503  Service Unavailable | (NOTE 2) |
|  | M | 1 | 508  Gateway  Timeout | (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [299] for the POST method also apply.  NOTE 2: Failure cases are described in clause 6.2.7. | | | | |

###### 6.2.3.3.4.3 Operation: release

6.2.3.3.4.3.1 Description

This operation update and release an existing charging session

6.2.3.3.4.3.2 Operation Definition

This operation shall support the request data structures specified in table 6.2.3.3.4.3.2-1 and the response data structures and response codes specified in table 6.2.3.3.4.3.2-2.

Table 6.2.3.3.4.3.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| ChargingDataRequest | M | 1 | Parameters to modify and then release the Offline Only Charging Data resource matching the OfflineChargingDataRef according to the representation in the OfflineChargingData.  The request URI is the representation in the Location header field in the 201 response of resource creation. |

Table 6.2.3.3.4.3.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a | M | 1 | 204 No Content | Successful case: The Offline Only Charging Data resource matching the OfflineChargingDataRef is modified and then released. |
| ChargingDataResponse | M | 1 | 404 Not Found | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of TS 29.500 [299] also apply.  NOTE 2: Failure cases are described in clause 6.2.7. | | | | |

### 6.2.4 Custom Operations without associated resources

None.

### 6.2.5 Data Model

#### 6.2.5.1 General

This clause specifies the application data model supported by the API.

The Nchf\_OfflineOnlyCharging Service API allows the NF consumer to consume the offline only charging service from the CHF as defined in 3GPP TS 32.290 [58].

Table 6.2.5.1-1 specifies the data types defined for the OfflineOlnyCharging service based interface protocol.

Table 6.2.5.1-1: Nchf\_ OfflineOnlyCharging specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| ChargingDataRequest | 6.2.5.2.1.1  6.2.5.2.2.1 | Describes the attributes of Charging Data Request to CHF for initial, update and termination of the charging session. |  |
| ChargingDataResponse | 6.2.5.2.1.2  6.2.5.2.2.2 | Describes the attributes of Charging Data Response from CHF on charging session initial, update and termination. |  |

The data types specified in Table 6.1.6.1-2 of this document are applied and re-used by the Nchf\_OfflineOnlyCharging service based interface protocol.

#### 6.2.5.2 Structured data types

##### 6.2.5.2.1 Common Data Type

###### 6.2.5.2.1.1 Type ChargingDataRequest

Table 6.2.5.2.1.1-1: Definition of type ChargingDataRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| subscriberIdentifier | SubscriberIdentifier | OM | 0..1 | Identifier of the subscriber that uses the requested service. |  |
| nfConsumerIdentification | NFConsumerIdentification | M | 1 | This is a grouped field which contains a set of information identifying the NF consumer of the charging service. |  |
| invocationTimeStamp | DateTime | M | 1 | The time at which the request is send |  |
| invocationSequenceNumber | Uint32 | M | 1 | This field contains the sequence number of the charging service invocation by the NF consumer ,i.e. the order of charging data requests.  The sequence number in charging data request [initial] starts from 1, and increased by 1 for subsequent charging data request.  It is allowed to start from 0 for backwards compatibility. |  |
| service SpecificationInformation | String | OC | 0..1 | Identifies service specific document that applies to the request, e.g. the service specific document ('middle tier' TS) and 3GPP release the service specific document is based upon. |  |
| multipleUnitUsage | array(MultipleUnitUsage) | OC | 0..N | This field contains the parameters for usage reporting. |  |
| triggers | array(Trigger) | OC | 0..N | This field identifies the event(s) triggering the request. |  |

###### 6.2.5.2.1.2 Type ChargingDataResponse

Table 6.2.5.2.1.2-1: Definition of type ChargingDataResponse

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| invocationTimestamp | DateTime | M | 1 | This field holds the timestamp of the charging service response from the CHF. |  |
| invocationResult | InvocationResult | OC | 1 | This field holds the result code in case of unsuccessful charging service invocation by the NF consumer |  |
| invocationSequenceNumber | Uint32 | M | 1 | This field contains the sequence number of the charging service invocation by the NF consumer.The same value of the sequence number received in the request should be used in the response |  |
| sessionFailover | SessionFailover | OC | 0..1 | This field indicates whether alternative CHF is supported for ongoing charging service failover handling by NF consumer. |  |
| triggers | array(Trigger) | OC | 0..N | This field identifies the chargeable event(s) supplied by CHF to override/activate the existing chargeable event(s) in NF consumer.  The presence of the triggers attribute without any triggerType is used by CHF to disable all the triggers. |  |

###### 6.2.5.2.1.3 Type MultipleUnitUsage

Table 6.2.5.2.1.3-1: Definition of type MultipleUnitUsage

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| ratingGroup | RatingGroup | M | 1 | The identifier of a rating group. |  |
| usedUnitContainer | array(UsedUnitContainer) | OC | 0..N | This field contains the amount of used non-monetary service units measured. |  |

###### 6.2.5.2.1.4 Type UsedUnitContainer

Table 6.2.5.2.1.4-1: Definition of type UsedUnitContainer

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| serviceId | ServiceId | OC | 0..1 | This field identity of the used service |  |
| triggers | array (Trigger) | OC | 0..N | This field specifies the reason for usage reporting for one or more types of unit associated to the rating group. |  |
| triggerTimestamp | DateTime | Oc | 0..1 | This field holds the timestamp when the reporting trigger occur. |  |
| time | Uint32 | OC | 0..1 | This field holds the amount of requested time. |  |
| totalVolume | Uint64 | OC | 0..1 | This field holds the amount of requested volume in both uplink and downlink directions. |  |
| uplinkVolume | Uint64 | OC | 0..1 | This field holds the amount of requested volume in uplink direction. |  |
| downlinkVolume | Uint64 | OC | 0..1 | This field holds the amount of requested volume in downlink direction. |  |
| serviceSpecific Units | Uint64 | OC | 0..1 | This field holds the amount of used service specific units. |  |
| eventTimeStamps | Array(DateTime) | OC | 0..N | This field holds the timestamps of the event reported in the Service Specific Unit s, if the reported units are event based |  |
| localSequenceNumber | integer | M | 1 | holds the Used Unit sequence number, i.e. the order when charging event occurs. It increased by 1 for each Used Unit generation. |  |

###### 6.2.5.2.1.5 Type Trigger

Table 6.2.5.2.1.5-1: Definition of type Trigger

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| triggerType | TriggerType | Oc | 0..1 | the events whose occurrence lead to charging event is issued towards the CHF |  |
| triggerCategory | TriggerCategory | M | 1 | This field indicates whether the charging data generated by the NF consumer for the trigger lead to a Charging Event towards the CHF immediately or not. |  |
| timeLimit | DurationSec | OC | 0..1 | Time limit if trigger type is "Expiry of data time limit" |  |
| volumeLimit64 | Uint64 | OC | 0..1 | Volume limit if trigger type is "Expiry of data volume limit". |  |
| eventLimit | Uint32 | OC | 0..1 | Event limit if trigger type is "Expiry of data event limit" |  |
| maxNumberOfccc | Uint32 | OC | 0..1 | Maximum number if trigger type is "Max nb of number of charging condition changes" |  |

##### 6.2.5.2.2 5G Data Connectivity Specified Data Type

###### 6.2.5.2.2.1 Type ChargingDataRequest

The additional attributes of the type ChargingDataRequest defined in clause 6.2.5.2.1.1 for 5G data connectivity charging see table 6.1.6.2.2.1-1.

###### 6.2.5.2.2.2 Type ChargingDataResponse

The additional attributes of the type ChargingDataResponse defined in clause 6.2.5.2.1.2 for 5G data connectivity charging see table 6.1.6.2.2.2-1.

###### 6.2.5.2.2.3 Type MultipleUnitUsage

The additional attributes of the type MultipleUnitUsage defined in clause 6.2.5.2.1.3 for 5G data connectivity charging see table 6.1.6.2.2.3-1.

###### 6.2.5.2.2.4 Type UsedUnitContainer

The additional attributes of the type UsedUnitContainer defined in clause 6.2.5.2.1.4 for 5G data connectivity charging see table 6.1.6.2.2.5-1.

###### 6.2.5.2.2.5 Type PDUSessionChargingInformation

The additional attributes of the Type PDUSessionChargingInformation for 5G data connectivity charging see table 6.1.6.2.2.6-1.

###### 6.2.5.2.2.6 Type UserInformation

The additional attributes of the Type UserInformation for 5G data connectivity charging see table 6.1.6.2.2.7-1.

###### 6.2.5.2.2.7 Type PDUSessionInformation

The additional attributes of the Type PDUSessionInformation for 5G data connectivity charging see table 6.1.6.2.2.8-1.

###### 6.2.5.2.2.8 Type PDUContainerInformation

The additional attributes of the Type PDUContainerInformation for 5G data connectivity charging see table 6.1.6.2.2.9-1.

###### 6.2.5.2.2.9 Type NetworkSlicingInfo

The additional attributes of the Type NetworkSlicingInfo for 5G data connectivity charging see table 6.1.6.2.2.10-1.

###### 6.2.5.2.2.10 Type PDUAddress

The additional attributes of the Type PDUAddress for 5G data connectivity charging see table 6.1.6.2.2.11-1.

###### 6.2.5.2.2.11 Type ServingNetworkFunctionID

The additional attributes of the Type ServingNetworkFunctionID for 5G data connectivity charging see table 6.1.6.2.2.12-1.

###### 6.2.5.2.2.12 Type RoamingQBCInformation

The additional attributes of the Type RoamingQBCInformation for 5G data connectivity charging see table 6.1.6.2.2.13-1.

###### 6.2.5.2.2.13 Type MultipleQFIcontainer

The additional attributes of the Type MultipleQFIcontainer for 5G data connectivity charging see table 6.1.6.2.2.14-1.

###### 6.2.5.2.2.14 Type RoamingChargingProfile

The additional attributes of the Type RoamingChargingProfile for 5G data connectivity charging see table 6.1.6.2.2.15-1.

###### 6.2.5.2.2.15 Type QFIContainerInformation

The additional attributes of the Type QFIContainerInformation for 5G data connectivity charging see table 6.1.6.2.2.16-1.

###### 6.2.5.2.2.16 Type RANSecondaryRATUsageReport

The additional attributes of the Type RANSecondaryRATUsageReport for 5G data connectivity charging see table 6.1.6.2.2.17-1.

###### 6.2.5.2.2.17 Type QosFlowsUsageReport

The additional attributes of the Type QosFlowsUsageReport for 5G data connectivity charging see table 6.1.6.2.2.18-1.

#### 6.2.5.3 Simple data types and enumerations

##### 6.2.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

##### 6.2.5.3.2 Simple data types

The simple data types are the same as definitions in table 6.1.6.3.2-1.

##### 6.2.5.3.3 Enumeration: ChargingCharacteristicsSelectionMode

The Enumeration ChargingCharacteristicsSelectionMode is the same as definition in table 6.1.6.3.5-1.

##### 6.2.5.3.4 Enumeration: NodeFunctionality

Table 6.2.5.3.4-1: Enumeration NodeFunctionality

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| SMF | This field identifies that NF is a SMF. |  |
| I\_SMF | This field identifies that node is an I-SMF, only applicable for PDU session served by SMF + I-SMF. |  |

##### 6.2.5.3.5 Enumeration: TriggerType

Table 6.2.5.3.5-1: Enumeration TriggerType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| FINAL | a service termination has happened |  |
| ABNORMAL\_RELEASE | PDU session has abnormal released. |  |
| QOS\_CHANGE | In request message, this value is used to indicate that QoS change has happened. Any of elements of QoSData may result in QoS change. |  |
| VOLUME\_LIMIT | Volume limit has been reached. |  |
| TIME\_LIMIT | Time limit has been reached |  |
| EVENT\_LIMIT | Event limit has been reached |  |
| PLMN\_CHANGE | PLMN has been changed. |  |
| USER\_LOCATION\_CHANGE | In request message, this value is used to indicate that User location has been changed. The change in location information that triggered reporting is included. |  |
| RAT\_CHANGE | In request message, this value is used to indicate that RAT type has been changed. |  |
| SESSION\_AMBR\_CHANGE | In request message, this value is used to indicate that Session AMBR has been changed. |  |
| UE\_TIMEZONE\_CHANGE | In request message, this value is used to indicate that UE timezone has been changed. |  |
| TARIFF\_TIME\_CHANGE | Tariff time change has happened. |  |
| MAX\_NUMBER\_OF\_CHANGES\_IN CHARGING\_CONDITIONS | Max number of change has been reached |  |
| MANAGEMENT\_INTERVENTION | Management intervention |  |
| CHANGE\_OF\_UE\_PRESENCE\_IN PRESENCE\_REPORTING\_AREA | In request message, this value is used to indicate that Change of UE presence in PRA has happened.  In response message, this value is used to indicate a request of reporting the event that the user enters/leaves the area(s) as indicated in the presenceReportingArea Attribute |  |
| CHANGE\_OF\_3GPP\_PS\_DATA\_OFF\_STATUS | In request message, this value is used to indicate that Change of 3GPP PS Data off status has happened. |  |
| SERVING\_NODE\_CHANGE | A serving node (e.g., AMF) change in the NF Consumer |  |
| REMOVAL\_OF\_UPF | A used UPF is removed |  |
| ADDITION\_OF\_UPF | A new UPF is added. |  |
| INSERTION\_OF\_ISMF | A new I-SMF is inserted |  |
| REMOVAL\_OF\_ISMF | A used I-SMF is removed |  |
| CHANGE\_OF\_ISMF | A used I-SMF is removed, and a new I-SMF is inserted |  |
| START\_OF\_SERVICE\_DATA\_FLOW | A service data flow has started |  |
| GFBR\_GUARANTEED\_STATUS\_CHANGE | In request message,thisvalue is used to indicate that GFBR targets for the indicated SDFs are changed ("NOT\_GUARANTEED" or "GUARANTEED" again).  In response message, this value is used to indicate that a NF Consumer (CTF) needs to ensure requesting the notification from the access network and that a change in the GFBR targets shall cause the service consumer to ask for a re-authorization of the associated quota. |  |
| HANDOVER\_CANCEL | The handover is cancelled. |  |
| HANDOVER\_START | The handover is started. |  |
| HANDOVER\_COMPLETE | The handover is complete. |  |
| ADDITION\_OF\_ACCESS | Addition of access to the MA PDU session | ATSSS |
| REMOVAL\_OF\_ACCESS | Removal of access to the MA PDU session | ATSSS |
| START\_OF\_SDF\_ADDITIONAL\_ACCESS | Start of service data flow on additional access in a MA PDU session | ATSSS |

##### 6.2.5.3.6 Enumeration: ResultCode

Table 6.2.5.3.6-1: Enumeration ResultCode

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| SUCCESS | The CHF opens or updates CDR. |  |

##### 6.2.5.3.7 Enumeration: 3GPPPSDataOffStatus

The Enumeration 3GPPPSDataOffStatus is the same as definition in table 6.1.6.3.13-1.

##### 6.2.5.3.8 Enumeration: PartialRecordMethod

The Enumeration PartialRecordMethod is the same as definition in table 6.1.6.3.15-1.

##### 6.2.5.3.9 Enumeration: RoamerInOut

The Enumeration RoamerInOut is the same as definition in table 6.1.6.3.16-1.

##### 6.2.5.3.10 Void

### 6.2.6 Error handling

#### 6.2.6.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of TS 29.500 [299].

For the Nchf\_OfflineOnlyCharging API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [2]. Protocol errors and application errors specified in table 5.2.7.2-1 of TS 29.500 [299] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of TS 29.500 [299]. In addition, the requirements in the following clauses shall apply.

#### 6.2.6.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the Nchf\_OfflineOnlyCharging API compared to the Protocol Error Handling specified in clause 5.2.7.2 of TS 29.500 [299].

#### 6.2.6.3 Application errors

The application errors defined for the Nchf\_OfflineOnlyCharging API are listed in table 6.2.6.3-1. The CHF shall include in the HTTP status code a "ProblemDetails" data structure with the "cause" attribute indicating the application error as listed in table 6.2.6.3-1. The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [299] may also be used for the Nchf\_OfflineOnlyCharging service.

Table 6.1.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| CHARGING\_FAILED | 400 Bad Request | The HTTP request is rejected because the set of session or subscriber information needed by the CHF for charging or CDR creation is incomplete, erroneous, or not available. (E.g. Rating Group, subscriber information) |

### 6.2.7 Feature negotiation

The optional features in table 6.2.7-1 are defined for the Nchf\_OfflineOnlyCharging API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [299].

Table 6.2.7-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| X | ATSSS | This feature indicates support of Access Traffic Steering, Switching, Splitting (ATSSS). |

# 7 Bindings of CDR field, Information Element and Resource Attribute

## 7.0 General

This clause aims to describe the mapping between the Service Charging Information element, Resource Attribute and CDR field for 5G charging.

Table 7.1-1 and 7.2-1 describes the mapping of the Information Element, Resource Attribute and CDR field of CHF-CDR for 5G charging.

## 7.1 Bindings of common CDR field, Information Element and Resource Attribute

Table 7.1-1: Bindings of common CDR field, Information Element and Resource Attribute

| Information Element | CDR Field | Resource Attribute |
| --- | --- | --- |
| Session Identifier | Charging Session Identifier | /{ChargingDataRef }/ or  /{OfflineChargingDataRef}/ |
|  |  | **ChargingDataRequest** |
| Subscriber Identifier | Subscriber Identifier | /subscriberIdentifier |
| Charging Id | Charging Id | /chargingId |
| Invocation Timestamp | - | /invocationTimeStamp |
| Invocation Sequence Number | - | /invocationSequenceNumber |
| Retransmission Indicator | - | /retransmissionIndicator |
| One-time Event | - | /oneTimeEvent |
| NF Consumer Identification | NF Information | /nfConsumerIdentification |
| NF Name | NF Name | /nfConsumerIdentification/nFName |
| NF Address | NF Address | /nfConsumerIdentification/nFIPv4Address  /nfConsumerIdentification/nFIPv6Address  /nfConsumerIdentification/nFFqdn |
| NF PLMN ID | NF PLMN ID | /nfConsumerIdentification/nFPLMNID |
| NF Functionality | NF Functionality | /nfConsumerIdentification/nodeFunctionality |
| Notify URI |  | /notifyUri |
| Service Specification Information | Service Specification Information | /serviceSpecificationInfo |
| Multiple Unit Usage | List of Multiple Unit Usage | /multipleUnitUsage |
| Rating Group | Rating Group | /multipleUnitUsage/ratingGroup |
| Requested Unit | - | /multipleUnitUsage/requestedUnit |
| Time | - | /multipleUnitUsage/requestedUnit/time |
| Total Volume | - | /multipleUnitUsage/requestedUnit/totalVolume |
| Uplink Volume | - | /multipleUnitUsage/requestedUnit/uplinkVolume |
| Downlink Volume | - | /multipleUnitUsage/requestedUnit/downlinkVolume |
| Service Specific Units | - | /multipleUnitUsage/requestedUnit/serviceSpecificUnits |
| Used Unit Container | Used Unit Container | /multipleUnitUsage/usedUnitContainer |
| Service Identifier | Service Identifier | /multipleUnitUsage/usedUnitContainer/serviceId |
| Quota management Indicator | Quota management Indicator  Quota management Indicator Ext | /multipleUnitUsage/usedUnitContainer/quotaManagementIndicator |
| Triggers | Triggers | /multipleUnitUsage/usedUnitContainer/triggers |
| Trigger Timestamp | Trigger Timestamp | /multipleUnitUsage/usedUnitContainer/triggerTimestamp |
| Time | Time | /multipleUnitUsage/usedUnitContainer/time |
| Total Volume | Total Volume | /multipleUnitUsage/usedUnitContainer/totalVolume |
| Uplink Volume | Uplink Volume | /multipleUnitUsage/usedUnitContainer/uplinkVolume |
| Downlink Volume | Downlink Volume | /multipleUnitUsage/usedUnitContainer/downlinkVolume |
| Service Specific Unit | Service Specific Unit | /multipleUnitUsage/usedUnitContainer/serviceSpecificUnits |
| Event Time Stamps | Event Time Stamps | /multipleUnitUsage/usedUnitContainer/eventTimeStamps |
| Local Sequence Number | Local Sequence Number | /multipleUnitUsage/usedUnitContainer/localSequenceNumber |
| Triggers | Triggers | /triggers |
|  |  | **ChargingDataResponse** |
| Invocation Timestamp |  | /invocationTimeStamp |
| Invocation Sequence Number |  | /invocationSequenceNumber |
| Session Failover | - | /sessionFailover |
| Triggers | - | /triggers |
| Multiple Unit Information | - | /multipleUnitInformation |
| Result Code | - | /multipleUnitInformation |
| Rating Group | - | /multipleUnitInformation/ratingGroup |
| Granted Unit | - | /multipleUnitInformation/grantedUnit |
| Tariff Time Change | - | /multipleUnitInformation/grantedUnit/tariffTimeChange |
| Time | - | /multipleUnitInformation/grantedUnit/time |
| Total Volume | - | /multipleUnitInformation/grantedUnit/totalVolume |
| Uplink Volume | - | /multipleUnitInformation/grantedUnit/uplinkVolume |
| Downlink Volume | - | /multipleUnitInformation/grantedUnit/downlinkVolume |
| Service Specific Units | - | /multipleUnitInformation/grantedUnit/serviceSpecificUnits |
| Triggers | - | /multipleUnitInformation/triggers |
| Validity Time | - | /multipleUnitInformation/validityTime |
| Quota Holding Time | - | /multipleUnitInformation/quotaHoldingTime |
| Final Unit Indication | - | /multipleUnitInformation/finalUnitIndication |
| Time Quota Threshold | - | /multipleUnitInformation/timeQuotaThreshold |
| Volume Quota Threshold | - | /multipleUnitInformation/volumeQuotaThreshold |
| Unit Quota Threshold | - | /multipleUnitInformation/unitQuotaThreshold |
| Invocation Result | - | /invocationResult |
| Invocation Result code | - | /invocationResult/error/cause |
| Failed parameter | - | /invocationResult/error/invalidParams |
| Failure Handling | - | /invocationResult/failureHandling |

## 7.2 Bindings for 5G data connectivity

Table 7.2-1: Bindings of 5G data connectivity CDR field, Information Element and Resource Attribute

| Information Element | CDR Field | Resource Attribute |
| --- | --- | --- |
|  |  | **ChargingDataRequest** |
| Supported Features | - | **/**supportedFeatures |
| Multiple Unit Usage | List of Multiple Unit Usage | /multipleUnitUsage |
| UPF ID | UPF ID | /multipleUnitUsage/uPFID |
| multi-homed PDU address | Multi-homed PDU address | /multipleUnitUsage/multihomedPDUAddress |
| Used Unit Container | Used Unit Container | /multipleUnitUsage/usedUnitContainer |
| PDU Container Information | PDU Container Information | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation |
| Time of First Usage | Time of First Usage | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/timeofFirstUsage |
| Time of Last Usage | Time of Last Usage | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/timeofLastUsage |
| QoS Information | QoS Information | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/qoSInformation |
| QoS Characteristics | QoS Characteristics | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/qoSCharacteristics |
| AF Charging Identifier | AF Charging Identifier | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/afChargingIdentifier |
| AF Charging Id String | AF Charging Id String | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/afChargingIdString |
| User Location Information | User Location Information | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/userLocationInformation |
| UE Time Zone | UE Time Zone | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/uetimeZone |
| RAT Type | RAT Type | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/rATType |
| Serving Network Function ID | Serving Network Function ID | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/servingNodeID |
| Presence Reporting Area Information | Presence Reporting Area  Information | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/ presenceReportingAreaInformation |
| 3GPP PS Data Off Status | 3GPP PS Data Off Status | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/3gppPSDataOffStatus |
| MA PDU Steering functionality | MA PDU Steering functionality | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/mAPDUSteeringFunctionality |
| MA PDU Steering mode | MA PDU Steering mode | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/mAPDUSteeringMode |
| Sponsor Identity | Sponsor Identity | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/sponsorIdentity |
| Application Service Provider  Identity | Application Service Provider  Identity | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/applicationserviceProviderIdentity |
| Charging Rule Base Name | Charging Rule Base Name | /multipleUnitUsage/usedUnitContainer/pDUContainerInformation/chargingRuleBaseName |
| PDU Session Charging Information | PDU Session Charging Information | /pDUSessionChargingInformation |
| Charging Id | Charging Id | /pDUSessionChargingInformation/chargingId |
| Home Provided ChargingId | Home Provided ChargingId | /pDUSessionChargingInformation/ homeProvidedChargingId |
| User Information | User Information | /pDUSessionChargingInformation/ userInformation |
| User Identifier | User Identifier | /pDUSessionChargingInformation/userInformation/servedGPSI |
| User Equipment Info | User Equipment Info | /pDUSessionChargingInformation/userInformation/ servedPEI |
| Unauthenticated Flag | Unauthenticated Flag | /pDUSessionChargingInformation/userInformation/ unauthenticatedFlag |
| Roamer In Out | Roamer In Out | /pDUSessionChargingInformation/userInformation/ roamerInOut |
| User Location Info | User Location Info | /pDUSessionChargingInformation/ userLocationinfo |
| MA PDU Non 3GPP User Location info | MA PDU Non 3GPP User Location info | /pDUSessionChargingInformation/mAPDUNon3GPPUserLocationInfo |
| Non 3GPP User Location Time | Non 3GPP User Location Time | /pDUSessionChargingInformation/non3GPPUserLocationTime |
| MA PDU Non 3GPP User Location Time | MA PDU Non 3GPP User Location Time | /pDUSessionChargingInformation/mAPDUNon3GPPUserLocationTime |
| UE Time Zone | UE Time Zone | /pDUSessionChargingInformation/uEtimeZone |
| Presence Reporting Area  Information | Presence Reporting Area  Information | /pDUSessionChargingInformation/ presenceReportingAreaInformation |
| PDU Session Information | PDU Session Information | /pDUSessionChargingInformation/pduSessionInformation |
| PDU Session ID | PDU Session ID | /pDUSessionChargingInformation/pduSessionInformation/pduSessionID |
| Network Slice Instance  Identifier | Network Slice Instance Identifier | /pDUSessionChargingInformation/pduSessionInformation/networkSlicingInfo |
| PDU Type | PDU Type | /pDUSessionChargingInformation /pduSessionInformation/pduType |
| PDU Address | PDU Address | /pDUSessionChargingInformation /pduSessionInformation/pduAddress |
| PDU IPv4 Address | PDU IPv4 Address | /pDUSessionChargingInformation/pduSessionInformation/pduAddress/pduIPv4Address |
| PDU IPv6 Address with  prefix | PDU IPv6 Address with prefix | /pDUSessionChargingInformation/pduSessionInformation/pduAddress/pduIPv6Addresswithprefix |
| PDU Address prefix length | PDU Address prefix length | /pDUSessionChargingInformation /pduSessionInformation/pduAddress/pduAddressprefixlength |
| IPv4 Dynamic Address  Flag | IPv4 Dynamic Address Flag | /pDUSessionChargingInformation /pduSessionInformation/pduAddress/ iPv4dynamicAddressFlag |
| IPv6 Dynamic Address Flag | IPv6 Dynamic Prefix Flag | pDUSessionChargingInformation /pduSessionInformation/pduAddress/ iPv6dynamicPrefixFlag |
| Additional PDU IPv6  Prefixes | Additional PDU IPv6 Prefixes | pDUSessionChargingInformation /pduSessionInformation/pduAddress/ addIpv6AddrPrefixes |
| pDUSessionChargingInformation /pduSessionInformation/pduAddress/ addIpv6AddrPrefixList |
| SSC Mode | SSC Mode | /pDUSessionChargingInformation /pduSessionInformation/sscMode |
| MA PDU session information | MA PDU session information | /pDUSessionChargingInformation /pduSessionInformation/mAPDUSessionInformation |
| MA PDU session indicator | MA PDU session indicator | /pDUSessionChargingInformation /pduSessionInformation/mAPDUSessionInformation/mAPDUSessionIndicator |
| ATSSS capability | ATSSS capability | /pDUSessionChargingInformation /pduSessionInformation/mAPDUSessionInformation/aTSSSCapability |
| SUPI PLMN ID | SUPI PLMN ID | /pDUSessionChargingInformation /pduSessionInformation/hPlmnId |
| Serving Network Function ID | Serving Network Function ID | /pDUSessionChargingInformation /pduSessionInformation/ servingNetworkFunctionID |
| Serving CN PLMN ID | Serving CN PLMN ID | /pDUSessionChargingInformation/pduSessionInformation/servingCNPlmnId |
| RAT Type | RAT Type | /pDUSessionChargingInformation /pduSessionInformation/ratType |
| MA PDU Non 3GPP RAT Type | MA PDU Non 3GPP RAT Type | /pDUSessionChargingInformation /pduSessionInformation/mAPDUNon3GPPRATType |
| Data Network Name Identifier | Data Network Name Identifier | /pDUSessionChargingInformation /pduSessionInformation/dnnid |
| DNN Selection Mode | DNN Selection Mode | /pDUSessionChargingInformation /pduSessionInformation/dNNselectionMode |
| Authorized QoS information | Authorized Qos Information | /pDUSessionChargingInformation /pduSessionInformation/authorized qoSInformation |
| Subscribed QoS Information | Subscribed QoS Information | /pDUSessionChargingInformation /pduSessionInformation/subscribedQoSInformation |
| Authorized Session-AMBR | Authorized Session-AMBR | /pDUSessionChargingInformation /pduSessionInformation/authorizedSessionAMBR |
| Subscribed Session-AMBR | Subscribed Session-AMBR | /pDUSessionChargingInformation /pduSessionInformation/subscribedSessionAMBR |
| Charging Characteristics | Charging Characteristics | /pDUSessionChargingInformation /pduSessionInformation/ chargingCharacteristics |
| Charging Characteristics  Selection Mode | Charging Characteristics Selection Mode | /pDUSessionChargingInformation /pduSessionInformation/chargingCharacteristicsSelectionMode |
| PDU session start Time | PDU session start Time | /pDUSessionChargingInformation /pduSessionInformation/startTime |
| PDU session stop Time | PDU session stop Time | /pDUSessionChargingInformation /pduSessionInformation/stopTime |
| Diagnostics | Diagnostics | /pDUSessionChargingInformation /pduSessionInformation/diagnostics |
| Enhanced Diagnostics | Enhanced Diagnostics | /pDUSessionChargingInformation /pduSessionInformation/enhancedDiagnostics |
| 3GPP PS Data Off Status | 3GPP PS Data Off Status | /pDUSessionChargingInformation /pduSessionInformation/3gppPSDataOffStatus |
| Session Stop Indicator | Session Stop Indicator | /pDUSessionChargingInformation /pduSessionInformation/sessionStopIndicator |
| Unit Count Inactivity Timer | - | /pDUSessionChargingInformation/unitCountInactivityTimer |
| RAN Secondary RAT Usage Report | RAN Secondary RAT Usage Report | /pDUSessionChargingInformation/rANSecondaryRATUsageReport |
| NG RAN Secondary RAT Type | NG RAN Secondary RAT Type | /pDUSessionChargingInformation/rANSecondaryRATUsageReport/rANSecondaryRATType |
| Qos Flows Usage Reports | Qos Flows Usage Reports | /pDUSessionChargingInformation/rANSecondaryRATUsageReport/qosFlowsUsageReports |
| Roaming QBC information | Roaming QBC information | /roamingQBCInformation |
| Multiple QFI container | Multiple QFI container | /roamingQBCInformation/multipleQFIcontainer |
| Triggers | Triggers | /roamingQBCInformation/multipleQFIcontainer/triggers |
| Trigger Timestamp | Trigger Timestamp | /roamingQBCInformation/multipleQFIcontainer/triggerTimestamp |
| Time | Time | /roamingQBCInformation/multipleQFIcontainer/time |
| Total Volume | Total Volume | /roamingQBCInformation/multipleQFIcontainer/totalVolume |
| Uplink Volume | Uplink Volume | /roamingQBCInformation/multipleQFIcontainer/uplinkVolume |
| Downlink Volume | Downlink Volume | /roamingQBCInformation/multipleQFIcontainer/downlinkVolume |
| Local Sequence Number | Local Sequence Number | /roamingQBCInformation/multipleQFIcontainer/localSequenceNumber |
| QFI Container information | QFI Container information | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation |
| QoS Flow Id | QoS Flow Id | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/qFI |
| Time of First Usage | Time of First Usage | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/ timeofFirstUsage |
| Time of Last Usage | Time of Last Usage | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/timeofLastUsage |
| QoS Information | QoS Information | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/qoSInformation |
| QoS Characteristics | QoS Characteristics | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/qoSCharacteristics |
| User Location Information | User Location Information | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/ userLocationInformation |
| UE Time Zone | UE Time Zone | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/uetimeZone |
| Presence Reporting Area Information | Presence Reporting Area Information | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/presenceReportingAreaInformation |
| RAT Type | RAT Type | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/rATType |
| Report Time | Report Time | /roamingQBCInformation/multipleQFIcontainer/ qFIContainerInformation/reportTime |
| Serving Network Function ID | Serving Network Function ID | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/ servingNetworkFunctionID |
| 3GPP PS Data Off Status | 3GPP PS Data Off Status | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/3gppPSDataOffStatus |
| EPS bearer Charging Id | EPS bearer Charging Id | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/3gppChargingId |
| Diagnostics | Diagnostics | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/diagnostics |
| Enhanced Diagnostics | Enhanced Diagnostics | /roamingQBCInformation/multipleQFIcontainer/qFIContainerInformation/enhancedDiagnostics |
| UPF ID | UPF ID | /roamingQBCInformation/uPFID |
| Roaming Charging Profile | Roaming Charging Profile | /roamingQBCInformation/roamingChargingProfile |
| Trigger | Trigger | /roamingQBCInformationroamingChargingProfile/trigger |
| Partial record method | Partial record method | /roamingQBCInformation/roamingChargingProfile/partialRecordMethod |
|  |  | **ChargingDataResponse** |
| Supported Features | - | **/**supportedFeatures |
| Multiple Unit information | - | /multipleUnitInformation |
| UPF ID | - | /multipleUnitInformation/uPFID |
| PDU Session Charging Information | - | /pDUSessionChargingInformation |
| Presence Reporting Area  Information | - | /pDUSessionChargingInformation/ presenceReportingAreaInformation |
| Unit Count Inactivity Timer | - | /pDUSessionChargingInformation/unitCountInactivityTimer |
| Roaming QBC information | - | /roamingQBCInformation |
| Roaming Charging Profile | - | /roamingQBCInformation/roamingChargingProfile |

## 7.3 Bindings for SMS charging

Table 7.3-1: Bindings of CDR field, Information Element and Resource Attribute for SMS charging

| Information Element | CDR Field | Resource Attribute |
| --- | --- | --- |
|  |  | **ChargingDataRequest** |
| Invocation Timestamp | Event Timestamp | /invocationTimeStamp |
| SMS Charging Information | SMS Charging Information | /sMSChargingInformation |
| Originator Info | Originator Info | /sMSChargingInformation/originatorInfo |
| Originator SUPI | Originator SUPI | /sMSChargingInformation/originatorInfo/originatorSUPI |
| Originator GPSI | Originator GPSI | /sMSChargingInformation/originatorInfo/originatorGPSI |
| Originator Other Address | Originator Other Address | /sMSChargingInformation/originatorInfo/originatorOtherAddress |
| Originator Received Address | Originator Received Address | /sMSChargingInformation/originatorInfo/originatorReceivedAddress |
| Originator SCCP Address | Originator SCCP Address | /sMSChargingInformation/originatorInfo/originatorSCCPAddress |
| SM Originator Interface | SM Originator Interface | /sMSChargingInformation/originatorInfo/sMOriginatorInterface |
| SM Originator Protocol Id | SM Originator Protocol Id | /sMSChargingInformation/originatorInfo/sMOriginatorProtocolId |
| Recipient Info | Recipient Info | /sMSChargingInformation/recipientInfo |
| Recipient SUPI | Recipient SUPI | /sMSChargingInformation/recipientInfo/recipientSUPI |
| Recipient GPSI | Recipient GPSI | /sMSChargingInformation/recipientInfo/recipientGPSI |
| Recipient Other Address | Recipient Other Address | /sMSChargingInformation/recipientInfo/recipientOtherAddress |
| Recipient Received Address | Recipient Received Address | /sMSChargingInformation/recipientInfo/recipientReceivedAddress |
| Recipient SCCP Address | Recipient SCCP Address | /sMSChargingInformation/recipientInfo/recipientSCCPAddress |
| SM Destination Interface | SM Destination Interface | /sMSChargingInformation/recipientInfo/sMDestinationInterface |
| SM Recipient Protocol Id | SM Recipient Protocol Id | /sMSChargingInformation/recipientInfo/sMrecipientProtocolId |
| User Equipment Info | User Equipment Info | /sMSChargingInformation/userEquipmentInfo |
| Roamer In Out | Roamer In Out | /sMSChargingInformation/userEquipmentInfo/roamerInOut |
| User Location Info | User Location Info | /sMSChargingInformation/userLocationinfo |
| UE Time Zone | UE Time Zone | /sMSChargingInformation/uetimeZone |
| RAT Type | RAT Type | /sMSChargingInformation/rATType |
| SMSC Address | SMSC Address | /sMSChargingInformation/sMSCAddress |
| SM Data Coding Scheme | SM Data Coding Scheme | /sMSChargingInformation/sMDataCodingScheme |
| SM Message Type | SM Message Type | /sMSChargingInformation/sMMessageType |
| SM Reply Path Requested | SM Reply Path Requested | /sMSChargingInformation/sMReplyPathRequested |
| SM User Data Header | SM User Data Header | /sMSChargingInformation/sMUserDataHeader |
| SM Status | SM Status | /sMSChargingInformation/sMStatus |
| SM Discharge Time | SM Discharge Time | /sMSChargingInformation/sMDischargeTime |
| Number of Messages Sent | Number of Messages Sent | /sMSChargingInformation/numberofMessagesSent |
| SM Service Type | SM Service Type | /sMSChargingInformation/sMServiceType |
| SM Sequence Number | SM Sequence Number | /sMSChargingInformation/sMSequenceNumber |
| SMS result | SMS result | /sMSChargingInformation/sMSresult |
| Submission Time | Submission Time | /sMSChargingInformation/submissionTime |
| SM Priority | SM Priority | /sMSChargingInformation/sMPriority |
| Message Reference | Message Reference | /sMSChargingInformation/messageReference |
| Message Size | Message Size | /sMSChargingInformation/messageSize |
| Message Class | Message Class | /sMSChargingInformation/messageClass |
| Delivery Report Requested | Delivery Report Requested | /sMSChargingInformation/deliveryReportRequested |
|  |  | **ChargingDataResponse** |
| - | - | - |

## 7.4 Bindings for 5G connection and mobility

Table 7.4-1: Bindings of 5G 5G connection and mobility CDR field, Information Element and Resource Attribute

| Information Element | CDR Field | Resource Attribute |
| --- | --- | --- |
|  |  | **ChargingDataRequest** |
| Registration Charging Information | Registration Charging Information | /registrationChargingInformation |
| Registration message type | Registration message type | /registrationChargingInformation/registrationMessagetype |
| User Information | User Information | /registrationChargingInformation/userInformation |
| User Identifier | User Identifier | /registrationChargingInformation/userInformation/servedGPSI |
| User Equipment Info | User Equipment Info | /registrationChargingInformation/userInformation/servedPEI |
| unauthenticatedFlag | unauthenticatedFlag | /registrationChargingInformation/userInformation/unauthenticatedFlag |
| Roamer In Out | Roamer In Out | /registrationChargingInformation/userInformation/roamerInOut |
| User Location Information | User Location Information | /registrationChargingInformation/userLocationinfo |
| PSCell Information | PSCell Information | /registrationChargingInformation/pSCellInformation |
| UE Time Zone | UE Time Zone | /registrationChargingInformation/uetimeZone |
| RAT Type | RAT Type | /registrationChargingInformation/rATType |
| 5GMM Capability | 5GMM Capability | /registrationChargingInformation/5gMMCapability |
| MICO Mode Indication | MICO Mode Indication | /registrationChargingInformation/mICOModeIndication |
| SMS Supported Indication | SMS Supported Indication | /registrationChargingInformation/smsIndication |
| TAI List | TAI List | /registrationChargingInformation/taiList |
| Service Area Restrictions | Service Area Restrictions | /registrationChargingInformation/serviceAreaRestriction |
| Requested NSSAI | Requested NSSAI | /registrationChargingInformation/requestedNSSAI |
| Allowed NSSAI | Allowed NSSAI | /registrationChargingInformation/allowedNssai |
| Rejected NSSAI | Rejected NSSAI | /registrationChargingInformation/rejectedNSSAI |
| NSSAI mapping list | NSSAI mapping list | /registrationChargingInformation/nSSAIMapList |
| AMF UE NGAP ID | AMF UE NGAP ID | /registrationChargingInformation/amfUeNgapId |
| RAN UE NGAP ID | RAN UE NGAP ID | /registrationChargingInformation/ranUeNgapId |
| RAN Node Id | RAN Node Id | /registrationChargingInformation/ranNodeId |
| N2 Connection Charging Information | N2 Connection Charging Information | /n2ConnectionChargingInformation |
| N2 Connection message type | N2 Connection message type | /n2ConnectionChargingInformation/n2ConnectionMessageType |
| User Information | User Information | /registrationChargingInformation/userInformation |
| User Identifier | User Identifier | /n2ConnectionChargingInformation/userInformation/servedGPSI |
| User Equipment Info | User Equipment Info | /n2ConnectionChargingInformation/userInformation/servedPEI |
| unauthenticatedFlag | unauthenticatedFlag | /n2ConnectionChargingInformation/userInformation/unauthenticatedFlag |
| Roamer In Out | Roamer In Out | /n2ConnectionChargingInformation/userInformation/roamerInOut |
| User Location Information | User Location Information | /n2ConnectionChargingInformation/userLocationinfo |
| PSCell Information | PSCell Information | /n2ConnectionChargingInformation/pSCellInformation |
| UE Time Zone | UE Time Zone | /n2ConnectionChargingInformation/uetimeZone |
| RAT Type | RAT Type | /n2ConnectionChargingInformation/rATType |
| AMF UE NGAP ID | AMF UE NGAP ID | /n2ConnectionChargingInformation/amfUeNgapId |
| RAN UE NGAP ID | RAN UE NGAP ID | /n2ConnectionChargingInformation/ranUeNgapId |
| RAN Node Id | RAN Node Id | /n2ConnectionChargingInformation/ranNodeId |
| Mobility Restrictions | Mobility Restrictions | /n2ConnectionChargingInformation/restrictedRatList  /n2ConnectionChargingInformation/forbiddenAreaList  /n2ConnectionChargingInformation/serviceAreaRestriction  /n2ConnectionChargingInformation/restrictedCnList |
| Allowed NSSAI | Allowed NSSAI | /n2ConnectionChargingInformation/allowedNssai |
| RRC Establishment Cause | RRC Establishment Cause | /n2ConnectionChargingInformation/rrcEstCause |
| Location Reporting Charging Information | Location Reporting Charging Information | /locationReportingChargingInformation |
| N2 Connection message type | N2 Connection message type | /locationReportingChargingInformation/n2ConnectionMessageType |
| User Information | User Information | /locationReportingChargingInformation/userInformation |
| User Identifier | User Identifier | /locationReportingChargingInformation/userInformation/servedGPSI |
| User Equipment Info | User Equipment Info | /locationReportingChargingInformation/userInformation/servedPEI |
| unauthenticatedFlag | unauthenticatedFlag | /locationReportingChargingInformation/userInformation/unauthenticatedFlag |
| Roamer In Out | Roamer In Out | /locationReportingChargingInformation/userInformation/roamerInOut |
| User Location Information | User Location Information | /locationReportingChargingInformation/userLocationinfo |
| PSCell Information | PSCell Information | locationReportingChargingInformation/pSCellInformation |
| UE Time Zone | UE Time Zone | /locationReportingChargingInformation/uetimeZone |
| Presence Reporting Area Information | Presence Reporting Area Information | /locationReportingChargingInformation/presenceReportingAreaInformation |
| RAT Type | RAT Type | /locationReportingChargingInformation/rATType |
|  |  | **ChargingDataResponse** |
| Supported Features | - | **/**supportedFeatures- |
| Location Reporting Charging Information | - | /locationReportingChargingInformation |
| Location reporting message type | - | /locationReportingChargingInformation/locationReportingMessageType |
| Presence Reporting Area  Information | - | /locationReportingChargingInformation /presenceReportingAreaInformation |

## 7.5 Bindings for Exposure Function Northbound API charging

Table 7.5-1: Bindings of CDR field, Information Element and Resource Attribute for Exposure Function Northbound API charging

| Information Element | CDR Field | Resource Attribute |
| --- | --- | --- |
|  |  | **ChargingDataRequest** |
| Exposure Function API Information | Exposure Function API Information | /nEFChargingInformation |
| External Individual Identifier | External Individual Identifier | /nEFChargingInformation/externalIndividualIdentifier |
| External Group Identifier | External Group Identifier | /nEFChargingInformation/externalGroupIdentifier |
| Internal Group Identifier | Internal Group Identifier | /nEFChargingInformation/groupIdentifier |
| API Direction | API Direction | /nEFChargingInformation/aPIDirection |
| API Target Network Function | API Target Network Function | /nEFChargingInformation/aPITargetNetworkFunction |
| API Result Code | API Result Code | /nEFChargingInformation/aPIResultCode |
| API Name | API Name | /nEFChargingInformation/aPIName |
| API Reference | API Reference | /nEFChargingInformation/aPIReference |
| API Content | API Content | /nEFChargingInformation/aPIContent |
|  |  | **ChargingDataResponse** |
| - | - | - |

## 7.6 Bindings for NS performance and Analytics charging

Table 7.6-1: Bindings of CDR field, Information Element and Resource Attribute for NS performance and Analytics charging

| Information Element | CDR Field | Resource Attribute |
| --- | --- | --- |
|  |  | **ChargingDataRequest** |
| Tenant Identifier | Tenant Identifier | /tenantIdentifier |
| Multiple Unit Usage | List of Multiple Unit Usage | /multipleUnitUsage |
| Used Unit Container | Used Unit Container | /multipleUnitUsage/usedUnitContainer |
| NSPA Container Information | NSPA Container Information | /multipleUnitUsage/usedUnitContainer/nSPAContanierInformation |
| Latency | Latency | /multipleUnitUsage/usedUnitContainer/nSPAContanierInformation/latency |
| Throughput | Throughput | /multipleUnitUsage/usedUnitContainer/nSPAContanierInformation/throughput |
| Maximum utilized bandwidth | Maximum utilized bandwidth | /multipleUnitUsage/usedUnitContainer/nSPAContanierInformation/maximumUtilizedBandwidth |
| Maximum packet loss rate | Maximum packet loss rate | /multipleUnitUsage/usedUnitContainer/nSPAContanierInformation/maximumPacketLossRate |
| Service Experience statistics data | Service Experience statistics data | /multipleUnitUsage/usedUnitContainer/nSPAContanierInformation/serviceExperienceStatisticsData |
| The number of PDU sessions | The number of PDU sessions | /multipleUnitUsage/usedUnitContainer/nSPAContanierInformation/theNumberOfPDUSessions |
| The number of Registered Subscribers | The number of Registered Subscribers | /multipleUnitUsage/usedUnitContainer/nSPAContanierInformation/theNumberOfRegisteredSubscribers |
| Load level | Load level | /multipleUnitUsage/usedUnitContainer/nSPAContanierInformation/loadLevel |
| NSPA Charging Information | NSPA Charging Information | /nSPAChargingInformation |
| Single NSSAI | Single NSSAI | /nSPAChargingInformation/singleNSSAI |
|  |  | **ChargingDataResponse** |
| - | - | - |

## 7.7 Bindings for NS Management charging

Table 7.7-1: Bindings of CDR field, Information Element and Resource Attribute for NS Management charging

| Information Element | CDR Field | Resource Attribute |
| --- | --- | --- |
|  |  | **ChargingDataRequest** |
| Tenant Identifier | Tenant Identifier | /tenantIdentifier |
| MnS Consumer Identifier | MnS Consumer Identifier | /mnSConsumerIdentifier |
| NSM Charging information | NSM Charging information | /nSMChargingInformation |
| Management operation | Management operation | /nSMChargingInformation/managementOperation |
| Identifier of NetworkSlice Instance | Identifier of NetworkSlice Instance | /nSMChargingInformation/idNetworkSliceInstance |
| List of Service profile charging information | List of Service profile charging information | /nSMChargingInformation/listOfserviceProfileChargingInformation |
| Service Profile Id | Service Profile Id | /nSMChargingInformation/serviceProfileIdentifier |
| S-NSSAIs List | S-NSSAIs List | /nSMChargingInformation/sNSSAIList |
| SST | SST | /nSMChargingInformation/sST |
| Latency | Latency | /nSMChargingInformation/latency |
| Availability | Availability | /nSMChargingInformation/availability |
| Resource Sharing Level | Resource Sharing Level | /nSMChargingInformation/resourceSharingLevel |
| Jitter | Jitter | /nSMChargingInformation/jitter |
| Reliability | Reliability | /nSMChargingInformation/reliability |
| Maximum Number of UEs | Maximum Number of UEs | /nSMChargingInformation/maxNumberofUEs |
| Coverage Area | Coverage Area | /nSMChargingInformation/coverageArea |
| UE Mobility Level | UE Mobility Level | /nSMChargingInformation/uEMobilityLevel |
| Delay Tolerance | Delay Tolerance | /nSMChargingInformation/delayToleranceIndicator |
| DL Throughput Per Slice | DL Throughput Per Slice | /nSMChargingInformation/dLThptPerSlice |
| DL Throughput Per UE | DL Throughput Per UE | /nSMChargingInformation/dLThptPerUE |
| UL Throughput Per Slice | UL Throughput Per Slice | /nSMChargingInformation/uLThptPerSlice |
| UL Throughput Per UE | UL Throughput Per UE | /nSMChargingInformation/uLThptPerUE |
| Max Number of PDU sessions | Max Number of PDU sessions | /nSMChargingInformation/maxNumberofPDUsessions |
| KPIs Monitoring list | KPIs Monitoring list | /nSMChargingInformation/kPIMonitoringList |
| Supported Access Technology | Supported Access Technology | /nSMChargingInformation/supportedAccessTechnology |
| V2X Communication Mode | V2X Communication Mode | /nSMChargingInformation/v2XCommunicationModeIndicator |
| Additional service profile charging information | Additional service profile charging information | /nSMChargingInformation/addServiceProfileInfo |
| Management operation status | Management operation status | /nSMChargingInformation/managementOperationStatus |
| Operational state | Operational state | /nSMChargingInformation/managementOperationalState |
| Administrative state | Administrative state | /nSMChargingInformation/managementAdministrativeState |
|  |  | **ChargingDataResponse** |
| - | - | - |

# 8 Security

Security aspects for service based interface shall be supported as specified in subclause 13 of 3GPP TS 33.501 [390].

As indicated in 3GPP TS 33.501 [390] and 3GPP TS 29.500 [299], the access to the Nchf\_ ConvergedCharging API and to the Nchf\_OfflineOnlyCharging API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [403]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [305]) plays the role of the authorization server.

If OAuth2 authorization is used, an NF Service Consumer, prior to consuming services offered by the Nchf\_ ConvergedCharging API and by the Nchf\_OfflineOnlyCharging API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [305], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Nchf\_ ConvergedCharging service. The same principle applies for Nchf\_OfflineOnlyCharging API.

The Nchf\_ ConvergedCharging API defines a single scope "nchf-convergedcharging" for the entire service, and it does not define any additional scopes at resource and operation level.

The Nchf\_OfflineOnlyCharging API defines a single scope "nchf-offlineonlycharging" for the entire service, and it does not define any additional scopes at resource and operation level.

Annex A (normative):  
OpenAPI specification

## A.1 General

The present Annex contains two OpenAPIs [500] specification of HTTP messages and content bodies used by the Nchf\_ConvergedCharging API and Nchf\_OfflineOnlyCharging API.

This Annex takes precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE 1: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification files contained in this document are available on a repository (see 3GPP TS 29.501 [300] clause 5.3.1 and 3GPP TR 21.900 [101] clause 5B)).

## A.2 Nchf\_ConvergedCharging API

openapi: 3.0.0

info:

title: Nchf\_ConvergedCharging

version: 3.0.7

description: |

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externalDocs:

description: >

3GPP TS 32.291 V16.15.0: Telecommunication management; Charging management;

5G system, charging service; Stage 3.

url: 'http://www.3gpp.org/ftp/Specs/archive/32\_series/32.291/'

servers:

- url: '{apiRoot}/nchf-convergedcharging/v3'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in subclause 4.4 of 3GPP TS 29.501.

security:

- {}

- oAuth2ClientCredentials:

- nchf-convergedcharging

paths:

/chargingdata:

post:

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ChargingDataRequest'

responses:

'201':

description: Created

content:

application/json:

schema:

$ref: '#/components/schemas/ChargingDataResponse'

'400':

description: Bad request

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'403':

description: Forbidden

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'404':

description: Not Found

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'410':

$ref: 'TS29571\_CommonData.yaml#/components/responses/410'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

callbacks:

chargingNotification:

'{$request.body#/notifyUri}':

post:

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ChargingNotifyRequest'

responses:

'204':

description: 'No Content, Notification was succesfull'

'400':

description: Bad request

content:

application/problem+json:

schema:

$ref: >-

TS29571\_CommonData.yaml#/components/schemas/ProblemDetails

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

'/chargingdata/{ChargingDataRef}/update':

post:

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ChargingDataRequest'

parameters:

- name: ChargingDataRef

in: path

description: a unique identifier for a charging data resource in a PLMN

required: true

schema:

type: string

responses:

'200':

description: OK. Updated Charging Data resource is returned

content:

application/json:

schema:

$ref: '#/components/schemas/ChargingDataResponse'

'400':

description: Bad request

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'403':

description: Forbidden

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'404':

description: Not Found

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'410':

$ref: 'TS29571\_CommonData.yaml#/components/responses/410'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

'/chargingdata/{ChargingDataRef}/release':

post:

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ChargingDataRequest'

parameters:

- name: ChargingDataRef

in: path

description: a unique identifier for a charging data resource in a PLMN

required: true

schema:

type: string

responses:

'204':

description: No Content.

'404':

description: Not Found

content:

application/problem+json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'410':

$ref: 'TS29571\_CommonData.yaml#/components/responses/410'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nchf-convergedcharging: Access to the Nchf\_ConvergedCharging API

schemas:

ChargingDataRequest:

type: object

properties:

subscriberIdentifier:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Supi'

tenantIdentifier:

type: string

chargingId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ChargingId'

mnSConsumerIdentifier:

type: string

nfConsumerIdentification:

$ref: '#/components/schemas/NFIdentification'

invocationTimeStamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

invocationSequenceNumber:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

retransmissionIndicator:

type: boolean

oneTimeEvent:

type: boolean

oneTimeEventType:

$ref: '#/components/schemas/oneTimeEventType'

notifyUri:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

serviceSpecificationInfo:

type: string

multipleUnitUsage:

type: array

items:

$ref: '#/components/schemas/MultipleUnitUsage'

minItems: 0

triggers:

type: array

items:

$ref: '#/components/schemas/Trigger'

minItems: 0

pDUSessionChargingInformation:

$ref: '#/components/schemas/PDUSessionChargingInformation'

roamingQBCInformation:

$ref: '#/components/schemas/RoamingQBCInformation'

sMSChargingInformation:

$ref: '#/components/schemas/SMSChargingInformation'

nEFChargingInformation:

$ref: '#/components/schemas/NEFChargingInformation'

registrationChargingInformation:

$ref: '#/components/schemas/RegistrationChargingInformation'

n2ConnectionChargingInformation:

$ref: '#/components/schemas/N2ConnectionChargingInformation'

locationReportingChargingInformation:

$ref: '#/components/schemas/LocationReportingChargingInformation'

nSPAChargingInformation:

$ref: '#/components/schemas/NSPAChargingInformation'

nSMChargingInformation:

$ref: '#/components/schemas/NSMChargingInformation'

required:

- nfConsumerIdentification

- invocationTimeStamp

- invocationSequenceNumber

ChargingDataResponse:

type: object

properties:

invocationTimeStamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

invocationSequenceNumber:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

invocationResult:

$ref: '#/components/schemas/InvocationResult'

sessionFailover:

$ref: '#/components/schemas/SessionFailover'

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

multipleUnitInformation:

type: array

items:

$ref: '#/components/schemas/MultipleUnitInformation'

minItems: 0

triggers:

type: array

items:

$ref: '#/components/schemas/Trigger'

minItems: 0

pDUSessionChargingInformation:

$ref: '#/components/schemas/PDUSessionChargingInformation'

roamingQBCInformation:

$ref: '#/components/schemas/RoamingQBCInformation'

locationReportingChargingInformation:

$ref: '#/components/schemas/LocationReportingChargingInformation'

required:

- invocationTimeStamp

- invocationSequenceNumber

ChargingNotifyRequest:

type: object

properties:

notificationType:

$ref: '#/components/schemas/NotificationType'

reauthorizationDetails:

type: array

items:

$ref: '#/components/schemas/ReauthorizationDetails'

minItems: 0

required:

- notificationType

ChargingNotifyResponse:

type: object

properties:

invocationResult:

$ref: '#/components/schemas/InvocationResult'

NFIdentification:

type: object

properties:

nFName:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

nFIPv4Address:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

nFIPv6Address:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

nFPLMNID:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnId'

nodeFunctionality:

$ref: '#/components/schemas/NodeFunctionality'

nFFqdn:

type: string

required:

- nodeFunctionality

MultipleUnitUsage:

type: object

properties:

ratingGroup:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatingGroup'

requestedUnit:

$ref: '#/components/schemas/RequestedUnit'

usedUnitContainer:

type: array

items:

$ref: '#/components/schemas/UsedUnitContainer'

minItems: 0

uPFID:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

multihomedPDUAddress:

$ref: '#/components/schemas/PDUAddress'

required:

- ratingGroup

InvocationResult:

type: object

properties:

error:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

failureHandling:

$ref: '#/components/schemas/FailureHandling'

Trigger:

type: object

properties:

triggerType:

$ref: '#/components/schemas/TriggerType'

triggerCategory:

$ref: '#/components/schemas/TriggerCategory'

timeLimit:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

volumeLimit:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

volumeLimit64:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

eventLimit:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

maxNumberOfccc:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

tariffTimeChange:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

required:

- triggerCategory

MultipleUnitInformation:

type: object

properties:

resultCode:

$ref: '#/components/schemas/ResultCode'

ratingGroup:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatingGroup'

grantedUnit:

$ref: '#/components/schemas/GrantedUnit'

triggers:

type: array

items:

$ref: '#/components/schemas/Trigger'

minItems: 0

validityTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

quotaHoldingTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

finalUnitIndication:

$ref: '#/components/schemas/FinalUnitIndication'

timeQuotaThreshold:

type: integer

volumeQuotaThreshold:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

unitQuotaThreshold:

type: integer

uPFID:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

required:

- ratingGroup

RequestedUnit:

type: object

properties:

time:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

totalVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

uplinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

downlinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

serviceSpecificUnits:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

UsedUnitContainer:

type: object

properties:

serviceId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ServiceId'

quotaManagementIndicator:

$ref: '#/components/schemas/QuotaManagementIndicator'

triggers:

type: array

items:

$ref: '#/components/schemas/Trigger'

minItems: 0

triggerTimestamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

time:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

totalVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

uplinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

downlinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

serviceSpecificUnits:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

eventTimeStamps:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

minItems: 0

localSequenceNumber:

type: integer

pDUContainerInformation:

$ref: '#/components/schemas/PDUContainerInformation'

nSPAContainerInformation:

$ref: '#/components/schemas/NSPAContainerInformation'

required:

- localSequenceNumber

GrantedUnit:

type: object

properties:

tariffTimeChange:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

time:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

totalVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

uplinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

downlinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

serviceSpecificUnits:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

FinalUnitIndication:

type: object

properties:

finalUnitAction:

$ref: '#/components/schemas/FinalUnitAction'

restrictionFilterRule:

$ref: '#/components/schemas/IPFilterRule'

filterId:

type: string

redirectServer:

$ref: '#/components/schemas/RedirectServer'

required:

- finalUnitAction

RedirectServer:

type: object

properties:

redirectAddressType:

$ref: '#/components/schemas/RedirectAddressType'

redirectServerAddress:

type: string

required:

- redirectAddressType

- redirectServerAddress

ReauthorizationDetails:

type: object

properties:

serviceId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ServiceId'

ratingGroup:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatingGroup'

quotaManagementIndicator:

$ref: '#/components/schemas/QuotaManagementIndicator'

PDUSessionChargingInformation:

type: object

properties:

chargingId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ChargingId'

homeProvidedChargingId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ChargingId'

userInformation:

$ref: '#/components/schemas/UserInformation'

userLocationinfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

mAPDUNon3GPPUserLocationInfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

non3GPPUserLocationTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

mAPDUNon3GPPUserLocationTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

presenceReportingAreaInformation:

type: object

additionalProperties:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PresenceInfo'

minProperties: 0

uetimeZone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

pduSessionInformation:

$ref: '#/components/schemas/PDUSessionInformation'

unitCountInactivityTimer:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'  
 rANSecondaryRATUsageReport:

$ref: '#/components/schemas/RANSecondaryRATUsageReport'

UserInformation:

type: object

properties:

servedGPSI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

servedPEI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Pei'

unauthenticatedFlag:

type: boolean

roamerInOut:

$ref: '#/components/schemas/RoamerInOut'

PDUSessionInformation:

type: object

properties:

networkSlicingInfo:

$ref: '#/components/schemas/NetworkSlicingInfo'

pduSessionID:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSessionId'

pduType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSessionType'

sscMode:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SscMode'

hPlmnId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnId'

servingNetworkFunctionID:

$ref: '#/components/schemas/ServingNetworkFunctionID'

ratType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

mAPDUNon3GPPRATType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

dnnId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

dnnSelectionMode:

$ref: '#/components/schemas/dnnSelectionMode'

chargingCharacteristics:

type: string

pattern: '^[0-9a-fA-F]{1,4}$'

chargingCharacteristicsSelectionMode:

$ref: '#/components/schemas/ChargingCharacteristicsSelectionMode'

startTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

stopTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

3gppPSDataOffStatus:

$ref: '#/components/schemas/3GPPPSDataOffStatus'

sessionStopIndicator:

type: boolean

pduAddress:

$ref: '#/components/schemas/PDUAddress'

diagnostics:

$ref: '#/components/schemas/Diagnostics'

authorizedQoSInformation:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/AuthorizedDefaultQos'

subscribedQoSInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SubscribedDefaultQos'

authorizedSessionAMBR:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ambr'

subscribedSessionAMBR:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ambr'

servingCNPlmnId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnId'

mAPDUSessionInformation:

$ref: '#/components/schemas/MAPDUSessionInformation'

enhancedDiagnostics:

$ref: '#/components/schemas/EnhancedDiagnostics5G'

required:

- pduSessionID

- dnnId

PDUContainerInformation:

type: object

properties:

timeofFirstUsage:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

timeofLastUsage:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

qoSInformation:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/QosData'

qoSCharacteristics:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/QosCharacteristics'

afChargingIdentifier:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ChargingId'

afChargingIdString:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ApplicationChargingId'

userLocationInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

uetimeZone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

rATType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

servingNodeID:

type: array

items:

$ref: '#/components/schemas/ServingNetworkFunctionID'

minItems: 0

presenceReportingAreaInformation:

type: object

additionalProperties:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PresenceInfo'

minProperties: 0

3gppPSDataOffStatus:

$ref: '#/components/schemas/3GPPPSDataOffStatus'

sponsorIdentity:

type: string

applicationserviceProviderIdentity:

type: string

chargingRuleBaseName:

type: string

mAPDUSteeringFunctionality:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/SteeringFunctionality'

mAPDUSteeringMode:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/SteeringMode'

NSPAContainerInformation:

type: object

properties:

latency:

type: integer

throughput:

$ref: '#/components/schemas/Throughput'

maximumPacketLossRate:

type: string

serviceExperienceStatisticsData:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/ServiceExperienceInfo'

theNumberOfPDUSessions:

type: integer

theNumberOfRegisteredSubscribers:

type: integer

loadLevel:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NsiLoadLevelInfo'

NSPAChargingInformation:

type: object

properties:

singleNSSAI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

required:

- singleNSSAI

NetworkSlicingInfo:

type: object

properties:

sNSSAI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

required:

- sNSSAI

PDUAddress:

type: object

properties:

pduIPv4Address:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

pduIPv6AddresswithPrefix:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

pduAddressprefixlength:

type: integer

iPv4dynamicAddressFlag:

type: boolean

iPv6dynamicPrefixFlag:

type: boolean

addIpv6AddrPrefixes:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

addIpv6AddrPrefixList:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

ServingNetworkFunctionID:

type: object

properties:

servingNetworkFunctionInformation:

$ref: '#/components/schemas/NFIdentification'

aMFId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AmfId'

required:

- servingNetworkFunctionInformation

RoamingQBCInformation:

type: object

properties:

multipleQFIcontainer:

type: array

items:

$ref: '#/components/schemas/MultipleQFIcontainer'

minItems: 0

uPFID:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

roamingChargingProfile:

$ref: '#/components/schemas/RoamingChargingProfile'

MultipleQFIcontainer:

type: object

properties:

triggers:

type: array

items:

$ref: '#/components/schemas/Trigger'

minItems: 0

triggerTimestamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

time:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

totalVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

uplinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

downlinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

localSequenceNumber:

type: integer

qFIContainerInformation:

$ref: '#/components/schemas/QFIContainerInformation'

required:

- localSequenceNumber

QFIContainerInformation:

type: object

properties:

qFI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Qfi'

reportTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

timeofFirstUsage:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

timeofLastUsage:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

qoSInformation:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/QosData'

qoSCharacteristics:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/QosCharacteristics'

userLocationInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

uetimeZone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

presenceReportingAreaInformation:

type: object

additionalProperties:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PresenceInfo'

minProperties: 0

rATType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

servingNetworkFunctionID:

type: array

items:

$ref: '#/components/schemas/ServingNetworkFunctionID'

minItems: 0

3gppPSDataOffStatus:

$ref: '#/components/schemas/3GPPPSDataOffStatus'

3gppChargingId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ChargingId'

diagnostics:

$ref: '#/components/schemas/Diagnostics'

enhancedDiagnostics:

type: array

items:

type: string

required:

- reportTime

RoamingChargingProfile:

type: object

properties:

triggers:

type: array

items:

$ref: '#/components/schemas/Trigger'

minItems: 0

partialRecordMethod:

$ref: '#/components/schemas/PartialRecordMethod'

SMSChargingInformation:

type: object

properties:

originatorInfo:

$ref: '#/components/schemas/OriginatorInfo'

recipientInfo:

type: array

items:

$ref: '#/components/schemas/RecipientInfo'

minItems: 0

userEquipmentInfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Pei'

roamerInOut:

$ref: '#/components/schemas/RoamerInOut'

userLocationinfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

uetimeZone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

rATType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

sMSCAddress:

type: string

sMDataCodingScheme:

type: integer

sMMessageType:

$ref: '#/components/schemas/SMMessageType'

sMReplyPathRequested:

$ref: '#/components/schemas/ReplyPathRequested'

sMUserDataHeader:

type: string

sMStatus:

type: string

pattern: '^[0-7]?[0-9a-fA-F]$'

sMDischargeTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

numberofMessagesSent:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

sMServiceType:

$ref: '#/components/schemas/SMServiceType'

sMSequenceNumber:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

sMSresult:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

submissionTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

sMPriority:

$ref: '#/components/schemas/SMPriority'

messageReference:

type: string

messageSize:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

messageClass:

$ref: '#/components/schemas/MessageClass'

deliveryReportRequested:

$ref: '#/components/schemas/DeliveryReportRequested'

OriginatorInfo:

type: object

properties:

originatorSUPI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Supi'

originatorGPSI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

originatorOtherAddress:

$ref: '#/components/schemas/SMAddressInfo'

originatorReceivedAddress:

$ref: '#/components/schemas/SMAddressInfo'

originatorSCCPAddress:

type: string

sMOriginatorInterface:

$ref: '#/components/schemas/SMInterface'

sMOriginatorProtocolId:

type: string

RecipientInfo:

type: object

properties:

recipientSUPI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Supi'

recipientGPSI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

recipientOtherAddress:

$ref: '#/components/schemas/SMAddressInfo'

recipientReceivedAddress:

$ref: '#/components/schemas/SMAddressInfo'

recipientSCCPAddress:

type: string

sMDestinationInterface:

$ref: '#/components/schemas/SMInterface'

sMrecipientProtocolId:

type: string

SMAddressInfo:

type: object

properties:

sMaddressType:

$ref: '#/components/schemas/SMAddressType'

sMaddressData:

type: string

sMaddressDomain:

$ref: '#/components/schemas/SMAddressDomain'

RecipientAddress:

type: object

properties:

recipientAddressInfo:

$ref: '#/components/schemas/SMAddressInfo'

sMaddresseeType:

$ref: '#/components/schemas/SMAddresseeType'

MessageClass:

type: object

properties:

classIdentifier:

$ref: '#/components/schemas/ClassIdentifier'

tokenText:

type: string

SMAddressDomain:

type: object

properties:

domainName:

type: string

3GPPIMSIMCCMNC:

type: string

SMInterface:

type: object

properties:

interfaceId:

type: string

interfaceText:

type: string

interfacePort:

type: string

interfaceType:

$ref: '#/components/schemas/InterfaceType'

RANSecondaryRATUsageReport:

type: object

properties:

rANSecondaryRATType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

qosFlowsUsageReports:

type: array

items:

$ref: '#/components/schemas/QosFlowsUsageReport'

Diagnostics:

type: integer

IPFilterRule:

type: string

QosFlowsUsageReport:

type: object

properties:

qFI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Qfi'

startTimestamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

endTimestamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

uplinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

downlinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

NEFChargingInformation:

type: object

properties:

externalIndividualIdentifier:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

externalGroupIdentifier:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ExternalGroupId'

groupIdentifier:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/GroupId'

aPIDirection:

$ref: '#/components/schemas/APIDirection'

aPITargetNetworkFunction:

$ref: '#/components/schemas/NFIdentification'

aPIResultCode:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

aPIName:

type: string

aPIReference:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

aPIContent:

type: string

required:

- aPIName

RegistrationChargingInformation:

type: object

properties:

registrationMessagetype:

$ref: '#/components/schemas/RegistrationMessageType'

userInformation:

$ref: '#/components/schemas/UserInformation'

userLocationinfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

pSCellInformation:

$ref: '#/components/schemas/PSCellInformation'

uetimeZone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

rATType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

5GMMCapability:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Bytes'

mICOModeIndication:

$ref: '#/components/schemas/MICOModeIndication'

smsIndication:

$ref: '#/components/schemas/SmsIndication'

taiList:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Tai'

minItems: 0

serviceAreaRestriction:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ServiceAreaRestriction'

minItems: 0

requestedNSSAI:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

minItems: 0

allowedNSSAI:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

minItems: 0

rejectedNSSAI:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

minItems: 0

nSSAIMapList:

type: array

items:

$ref: '#/components/schemas/NSSAIMap'

minItems: 0

amfUeNgapId:

type: integer

ranUeNgapId:

type: integer

ranNodeId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/GlobalRanNodeId'

required:

- registrationMessagetype

PSCellInformation:

type: object

properties:

nrcgi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ncgi'

ecgi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ecgi'

NSSAIMap:

type: object

properties:

servingSnssai:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

homeSnssai:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

required:

- servingSnssai

- homeSnssai

N2ConnectionChargingInformation:

type: object

properties:

n2ConnectionMessageType:

$ref: '#/components/schemas/N2ConnectionMessageType'

userInformation:

$ref: '#/components/schemas/UserInformation'

userLocationinfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

pSCellInformation:

$ref: '#/components/schemas/PSCellInformation'

uetimeZone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

rATType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

amfUeNgapId:

type: integer

ranUeNgapId:

type: integer

ranNodeId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/GlobalRanNodeId'

restrictedRatList:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

minItems: 0

forbiddenAreaList:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Area'

minItems: 0

serviceAreaRestriction:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ServiceAreaRestriction'

minItems: 0

restrictedCnList:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/CoreNetworkType'

minItems: 0

allowedNSSAI:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

minItems: 0

rrcEstCause:

type: string

pattern: '^[0-9a-fA-F]+$'

required:

- n2ConnectionMessageType

LocationReportingChargingInformation:

type: object

properties:

locationReportingMessageType:

$ref: '#/components/schemas/LocationReportingMessageType'

userInformation:

$ref: '#/components/schemas/UserInformation'

userLocationinfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

pSCellInformation:

$ref: '#/components/schemas/PSCellInformation'

uetimeZone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

rATType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

presenceReportingAreaInformation:

type: object

additionalProperties:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PresenceInfo'

minProperties: 0

required:

- locationReportingMessageType

N2ConnectionMessageType:

type: integer

LocationReportingMessageType:

type: integer

NSMChargingInformation:

type: object

properties:

managementOperation:

$ref: '#/components/schemas/ManagementOperation'

idNetworkSliceInstance:

type: string

listOfserviceProfileChargingInformation:

type: array

items:

$ref: '#/components/schemas/ServiceProfileChargingInformation'

minItems: 0

managementOperationStatus:

$ref: '#/components/schemas/ManagementOperationStatus'

# To be introduced once the reference to 'generic.yaml is resolved

# managementOperationalState:

# $ref: 'genericNrm.yaml#/components/schemas/OperationalState'

# managementAdministrativeState:

# $ref: 'genericNrm.yaml#/components/schemas/AdministrativeState'

required:

- managementOperation

ServiceProfileChargingInformation:

type: object

properties:

serviceProfileIdentifier:

type: string

sNSSAIList:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

minItems: 0

# To be introduced once the reference to 'nrNrm.yaml is resolved

# sST:

# $ref: 'nrNrm.yaml#/components/schemas/Sst'

latency:

type: integer

availability:

type: number

# To be introduced once the reference to sliceNrm.yaml is resolved

# resourceSharingLevel:

# $ref: 'sliceNrm.yaml#/components/schemas/SharingLevel'

jitter:

type: integer

reliability:

type: string

maxNumberofUEs:

type: integer

coverageArea:

type: string

# To be introduced once the reference to sliceNrm.yaml is resolved

# uEMobilityLevel:

# $ref: 'sliceNrm.yaml#/components/schemas/MobilityLevel'

# delayToleranceIndicator:

# $ref: 'sliceNrm.yaml#/components/schemas/Support'

dLThptPerSlice:

$ref: '#/components/schemas/Throughput'

dLThptPerUE:

$ref: '#/components/schemas/Throughput'

uLThptPerSlice:

$ref: '#/components/schemas/Throughput'

uLThptPerUE:

$ref: '#/components/schemas/Throughput'

maxNumberofPDUsessions:

type: integer

kPIMonitoringList:

type: string

supportedAccessTechnology:

type: integer

# To be introduced once the reference to sliceNrm.yaml is resolved

# v2XCommunicationModeIndicator:

# $ref: 'sliceNrm.yaml#/components/schemas/Support'

addServiceProfileInfo:

type: string

Throughput:

type: object

properties:

guaranteedThpt:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Float'

maximumThpt:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Float'

MAPDUSessionInformation:

type: object

properties:

mAPDUSessionIndicator:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/MaPduIndication'

aTSSSCapability:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AtsssCapability'

EnhancedDiagnostics5G:

$ref: '#/components/schemas/RanNasCauseList'

RanNasCauseList:

type: array

items:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/RanNasRelCause'

NotificationType:

anyOf:

- type: string

enum:

- REAUTHORIZATION

- ABORT\_CHARGING

- type: string

NodeFunctionality:

anyOf:

- type: string

enum:

- AMF

- SMF

- SMS # Included for backwards compatibility, shall not be used

- SMSF

- PGW\_C\_SMF

- NEFF # Included for backwards compatibility, shall not be used

- SGW

- I\_SMF

- ePDG

- CEF

- NEF

- MnS\_Producer

- type: string

ChargingCharacteristicsSelectionMode:

anyOf:

- type: string

enum:

- HOME\_DEFAULT

- ROAMING\_DEFAULT

- VISITING\_DEFAULT

- type: string

TriggerType:

anyOf:

- type: string

enum:

- QUOTA\_THRESHOLD

- QHT

- FINAL

- QUOTA\_EXHAUSTED

- VALIDITY\_TIME

- OTHER\_QUOTA\_TYPE

- FORCED\_REAUTHORISATION

- UNUSED\_QUOTA\_TIMER # Included for backwards compatibility, shall not be used

- UNIT\_COUNT\_INACTIVITY\_TIMER

- ABNORMAL\_RELEASE

- QOS\_CHANGE

- VOLUME\_LIMIT

- TIME\_LIMIT

- EVENT\_LIMIT

- PLMN\_CHANGE

- USER\_LOCATION\_CHANGE

- RAT\_CHANGE

- SESSION\_AMBR\_CHANGE

- UE\_TIMEZONE\_CHANGE

- TARIFF\_TIME\_CHANGE

- MAX\_NUMBER\_OF\_CHANGES\_IN\_CHARGING\_CONDITIONS

- MANAGEMENT\_INTERVENTION

- CHANGE\_OF\_UE\_PRESENCE\_IN\_PRESENCE\_REPORTING\_AREA

- CHANGE\_OF\_3GPP\_PS\_DATA\_OFF\_STATUS

- SERVING\_NODE\_CHANGE

- REMOVAL\_OF\_UPF

- ADDITION\_OF\_UPF

- INSERTION\_OF\_ISMF

- REMOVAL\_OF\_ISMF

- CHANGE\_OF\_ISMF

- START\_OF\_SERVICE\_DATA\_FLOW

- ECGI\_CHANGE

- TAI\_CHANGE

- HANDOVER\_CANCEL

- HANDOVER\_START

- HANDOVER\_COMPLETE

- GFBR\_GUARANTEED\_STATUS\_CHANGE

- ADDITION\_OF\_ACCESS

- REMOVAL\_OF\_ACCESS

- START\_OF\_SDF\_ADDITIONAL\_ACCESS

- type: string

FinalUnitAction:

anyOf:

- type: string

enum:

- TERMINATE

- REDIRECT

- RESTRICT\_ACCESS

- type: string

RedirectAddressType:

anyOf:

- type: string

enum:

- IPV4

- IPV6

- URL

- type: string

TriggerCategory:

anyOf:

- type: string

enum:

- IMMEDIATE\_REPORT

- DEFERRED\_REPORT

- type: string

QuotaManagementIndicator:

anyOf:

- type: string

enum:

- ONLINE\_CHARGING

- OFFLINE\_CHARGING

- QUOTA\_MANAGEMENT\_SUSPENDED

- type: string

FailureHandling:

anyOf:

- type: string

enum:

- TERMINATE

- CONTINUE

- RETRY\_AND\_TERMINATE

- type: string

SessionFailover:

anyOf:

- type: string

enum:

- FAILOVER\_NOT\_SUPPORTED

- FAILOVER\_SUPPORTED

- type: string

3GPPPSDataOffStatus:

anyOf:

- type: string

enum:

- ACTIVE

- INACTIVE

- type: string

ResultCode:

anyOf:

- type: string

enum:

- SUCCESS

- END\_USER\_SERVICE\_DENIED

- QUOTA\_MANAGEMENT\_NOT\_APPLICABLE

- QUOTA\_LIMIT\_REACHED

- END\_USER\_SERVICE\_REJECTED

- USER\_UNKNOWN

- RATING\_FAILED

- QUOTA\_MANAGEMENT

- type: string

PartialRecordMethod:

anyOf:

- type: string

enum:

- DEFAULT

- INDIVIDUAL

- type: string

RoamerInOut:

anyOf:

- type: string

enum:

- IN\_BOUND

- OUT\_BOUND

- type: string

SMMessageType:

anyOf:

- type: string

enum:

- SUBMISSION

- DELIVERY\_REPORT

- SM\_SERVICE\_REQUEST

- DELIVERY

- type: string

SMPriority:

anyOf:

- type: string

enum:

- LOW

- NORMAL

- HIGH

- type: string

DeliveryReportRequested:

anyOf:

- type: string

enum:

- YES

- NO

- type: string

InterfaceType:

anyOf:

- type: string

enum:

- UNKNOWN

- MOBILE\_ORIGINATING

- MOBILE\_TERMINATING

- APPLICATION\_ORIGINATING

- APPLICATION\_TERMINATING

- type: string

ClassIdentifier:

anyOf:

- type: string

enum:

- PERSONAL

- ADVERTISEMENT

- INFORMATIONAL

- AUTO

- type: string

SMAddressType:

anyOf:

- type: string

enum:

- EMAIL\_ADDRESS

- MSISDN

- IPV4\_ADDRESS

- IPV6\_ADDRESS

- NUMERIC\_SHORTCODE

- ALPHANUMERIC\_SHORTCODE

- OTHER

- IMSI

- type: string

SMAddresseeType:

anyOf:

- type: string

enum:

- TO

- CC

- BCC

- type: string

SMServiceType:

anyOf:

- type: string

enum:

- VAS4SMS\_SHORT\_MESSAGE\_CONTENT\_PROCESSING

- VAS4SMS\_SHORT\_MESSAGE\_FORWARDING

- VAS4SMS\_SHORT\_MESSAGE\_FORWARDING\_MULTIPLE\_SUBSCRIPTIONS

- VAS4SMS\_SHORT\_MESSAGE\_FILTERING

- VAS4SMS\_SHORT\_MESSAGE\_RECEIPT

- VAS4SMS\_SHORT\_MESSAGE\_NETWORK\_STORAGE

- VAS4SMS\_SHORT\_MESSAGE\_TO\_MULTIPLE\_DESTINATIONS

- VAS4SMS\_SHORT\_MESSAGE\_VIRTUAL\_PRIVATE\_NETWORK(VPN)

- VAS4SMS\_SHORT\_MESSAGE\_AUTO\_REPLY

- VAS4SMS\_SHORT\_MESSAGE\_PERSONAL\_SIGNATURE

- VAS4SMS\_SHORT\_MESSAGE\_DEFERRED\_DELIVERY

- type: string

ReplyPathRequested:

anyOf:

- type: string

enum:

- NO\_REPLY\_PATH\_SET

- REPLY\_PATH\_SET

- type: string

oneTimeEventType:

anyOf:

- type: string

enum:

- IEC

- PEC

- type: string

dnnSelectionMode:

anyOf:

- type: string

enum:

- VERIFIED

- UE\_DNN\_NOT\_VERIFIED

- NW\_DNN\_NOT\_VERIFIED

- type: string

APIDirection:

anyOf:

- type: string

enum:

- INVOCATION

- NOTIFICATION

- type: string

RegistrationMessageType:

anyOf:

- type: string

enum:

- INITIAL

- MOBILITY

- PERIODIC

- EMERGENCY

- DEREGISTRATION

- type: string

MICOModeIndication:

anyOf:

- type: string

enum:

- MICO\_MODE

- NO\_MICO\_MODE

- type: string

SmsIndication:

anyOf:

- type: string

enum:

- SMS\_SUPPORTED

- SMS\_NOT\_SUPPORTED

- type: string

ManagementOperation:

anyOf:

- type: string

enum:

- CreateMOI #Included for backwards compatibility, shall not be used

- ModifyMOIAttributes #Included for backwards compatibility, shall not be used

- DeleteMOI #Included for backwards compatibility, shall not be used

- CREATE\_MOI

- MODIFY\_MOI\_ATTR

- DELETE\_MOI

- type: string

ManagementOperationStatus:

anyOf:

- type: string

enum:

- OPERATION\_SUCCEEDED

- OPERATION\_FAILED

- type: string

## A.3 Nchf\_OfflineOnlyCharging API

openapi: 3.0.0

info:

title: Nchf\_OfflineOnlyCharging

version: 1.0.2

description: |

OfflineOnlyCharging Service

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externalDocs:

description: >

3GPP TS 32.291 V16.14.0: Telecommunication management; Charging management;

5G system, charging service; Stage 3.

url: 'http://www.3gpp.org/ftp/Specs/archive/32\_series/32.291/'

servers:

- url: '{apiRoot}/nchf-offlineonlycharging/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in subclause 4.4 of 3GPP TS 29.501.

security:

- {}

- oAuth2ClientCredentials:

- nchf-offlineonlycharging

paths:

/offlinechargingdata:

post:

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ChargingDataRequest'

responses:

'201':

description: Created

content:

application/json:

schema:

$ref: '#/components/schemas/ChargingDataResponse'

'400':

description: Bad request

content:

application/json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'403':

description: Forbidden

content:

application/json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'404':

description: Not Found

content:

application/json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'410':

$ref: 'TS29571\_CommonData.yaml#/components/responses/410'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

'/offlinechargingdata/{OfflineChargingDataRef}/update':

post:

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ChargingDataRequest'

parameters:

- name: OfflineChargingDataRef

in: path

description: a unique identifier for a charging data resource in a PLMN

required: true

schema:

type: string

responses:

'200':

description: OK. Updated Charging Data resource is returned

content:

application/json:

schema:

$ref: '#/components/schemas/ChargingDataResponse'

'400':

description: Bad request

content:

application/json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'403':

description: Forbidden

content:

application/json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'404':

description: Not Found

content:

application/json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'410':

$ref: 'TS29571\_CommonData.yaml#/components/responses/410'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

'/offlinechargingdata/{OfflineChargingDataRef}/release':

post:

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ChargingDataRequest'

parameters:

- name: OfflineChargingDataRef

in: path

description: a unique identifier for a charging data resource in a PLMN

required: true

schema:

type: string

responses:

'204':

description: No Content.

'404':

description: Not Found

content:

application/json:

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'410':

$ref: 'TS29571\_CommonData.yaml#/components/responses/410'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nchf-offlineonlycharging: Access to the Nchf\_OfflineOnlyCharging API

schemas:

ChargingDataRequest:

type: object

properties:

subscriberIdentifier:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Supi'

nfConsumerIdentification:

$ref: '#/components/schemas/NFIdentification'

invocationTimeStamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

invocationSequenceNumber:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

retransmissionIndicator:

type: boolean

serviceSpecificationInfo:

type: string

multipleUnitUsage:

type: array

items:

$ref: '#/components/schemas/MultipleUnitUsage'

minItems: 0

triggers:

type: array

items:

$ref: '#/components/schemas/Trigger'

minItems: 0

pDUSessionChargingInformation:

$ref: '#/components/schemas/PDUSessionChargingInformation'

roamingQBCInformation:

$ref: '#/components/schemas/RoamingQBCInformation'

required:

- nfConsumerIdentification

- invocationTimeStamp

- invocationSequenceNumber

ChargingDataResponse:

type: object

properties:

invocationTimeStamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

invocationSequenceNumber:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

invocationResult:

$ref: '#/components/schemas/InvocationResult'

sessionFailover:

$ref: '#/components/schemas/SessionFailover'

triggers:

type: array

items:

$ref: '#/components/schemas/Trigger'

minItems: 0

pDUSessionChargingInformation:

$ref: '#/components/schemas/PDUSessionChargingInformation'

roamingQBCInformation:

$ref: '#/components/schemas/RoamingQBCInformation'

required:

- invocationTimeStamp

- invocationSequenceNumber

NFIdentification:

type: object

properties:

nFName:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

nFIPv4Address:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

nFIPv6Address:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

nFPLMNID:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnId'

nodeFunctionality:

$ref: '#/components/schemas/NodeFunctionality'

nFFqdn:

type: string

required:

- nodeFunctionality

MultipleUnitUsage:

type: object

properties:

ratingGroup:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatingGroup'

usedUnitContainer:

type: array

items:

$ref: '#/components/schemas/UsedUnitContainer'

minItems: 0

uPFID:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

multihomedPDUAddress:

$ref: '#/components/schemas/PDUAddress'

required:

- ratingGroup

InvocationResult:

type: object

properties:

error:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'

failureHandling:

$ref: '#/components/schemas/FailureHandling'

Trigger:

type: object

properties:

triggerType:

$ref: '#/components/schemas/TriggerType'

triggerCategory:

$ref: '#/components/schemas/TriggerCategory'

timeLimit:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

volumeLimit:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

volumeLimit64:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

eventLimit:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

maxNumberOfccc:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

required:

- triggerType

- triggerCategory

UsedUnitContainer:

type: object

properties:

serviceId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ServiceId'

triggers:

type: array

items:

$ref: '#/components/schemas/Trigger'

minItems: 0

triggerTimestamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

time:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

totalVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

uplinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

downlinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

serviceSpecificUnits:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

eventTimeStamps:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

minItems: 0

localSequenceNumber:

type: integer

pDUContainerInformation:

$ref: '#/components/schemas/PDUContainerInformation'

required:

- localSequenceNumber

PDUSessionChargingInformation:

type: object

properties:

chargingId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ChargingId'

userInformation:

$ref: '#/components/schemas/UserInformation'

userLocationinfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

mAPDUNon3GPPUserLocationInfo:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

userLocationTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

presenceReportingAreaInformation:

type: object

additionalProperties:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PresenceInfo'

minProperties: 0

uetimeZone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

pduSessionInformation:

$ref: '#/components/schemas/PDUSessionInformation'

unitCountInactivityTimer:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'  
 rANSecondaryRATUsageReport:

$ref: '#/components/schemas/RANSecondaryRATUsageReport'

required:

- pduSessionInformation

UserInformation:

type: object

properties:

servedGPSI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

servedPEI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Pei'

unauthenticatedFlag:

type: boolean

roamerInOut:

$ref: '#/components/schemas/RoamerInOut'

PDUSessionInformation:

type: object

properties:

networkSlicingInfo:

$ref: '#/components/schemas/NetworkSlicingInfo'

pduSessionID:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSessionId'

pduType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSessionType'

sscMode:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SscMode'

hPlmnId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnId'

servingNetworkFunctionID:

$ref: '#/components/schemas/ServingNetworkFunctionID'

ratType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

mAPDUNon3GPPRATType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

dnnId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

chargingCharacteristics:

type: string

chargingCharacteristicsSelectionMode:

$ref: '#/components/schemas/ChargingCharacteristicsSelectionMode'

startTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

stopTime:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

3gppPSDataOffStatus:

$ref: '#/components/schemas/3GPPPSDataOffStatus'

sessionStopIndicator:

type: boolean

pduAddress:

$ref: '#/components/schemas/PDUAddress'

diagnostics:

$ref: '#/components/schemas/Diagnostics'

authorizedQoSInformation:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/AuthorizedDefaultQos'

subscribedQoSInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SubscribedDefaultQos'

authorizedSessionAMBR:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ambr'

subscribedSessionAMBR:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ambr'

servingCNPlmnId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnId'

mAPDUSessionInformation:

$ref: '#/components/schemas/MAPDUSessionInformation'

enhancedDiagnostics:

$ref: '#/components/schemas/EnhancedDiagnostics5G'

required:

- pduSessionID

- dnnId

PDUContainerInformation:

type: object

properties:

timeofFirstUsage:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

timeofLastUsage:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

qoSInformation:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/QosData'

qoSCharacteristics:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/QosCharacteristics'

aFCorrelationInformation:

type: string

userLocationInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

uetimeZone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

rATType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

servingNodeID:

type: array

items:

$ref: '#/components/schemas/ServingNetworkFunctionID'

minItems: 0

presenceReportingAreaInformation:

type: object

additionalProperties:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PresenceInfo'

minProperties: 0

3gppPSDataOffStatus:

$ref: '#/components/schemas/3GPPPSDataOffStatus'

sponsorIdentity:

type: string

applicationserviceProviderIdentity:

type: string

chargingRuleBaseName:

type: string

mAPDUSteeringFunctionality:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/SteeringFunctionality'

mAPDUSteeringMode:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/SteeringMode'

NetworkSlicingInfo:

type: object

properties:

sNSSAI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

required:

- sNSSAI

PDUAddress:

type: object

properties:

pduIPv4Address:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

pduIPv6AddresswithPrefix:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

pduAddressprefixlength:

type: integer

iPv4dynamicAddressFlag:

type: boolean

iPv6dynamicPrefixFlag:

type: boolean

ServingNetworkFunctionID:

type: object

properties:

servingNetworkFunctionInformation:

$ref: '#/components/schemas/NFIdentification'

aMFId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AmfId'

required:

- servingNetworkFunctionInformation

RoamingQBCInformation:

type: object

properties:

multipleQFIcontainer:

type: array

items:

$ref: '#/components/schemas/MultipleQFIcontainer'

minItems: 0

uPFID:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

roamingChargingProfile:

$ref: '#/components/schemas/RoamingChargingProfile'

MultipleQFIcontainer:

type: object

properties:

triggers:

type: array

items:

$ref: '#/components/schemas/Trigger'

minItems: 0

triggerTimestamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

time:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

totalVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

uplinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

localSequenceNumber:

type: integer

qFIContainerInformation:

$ref: '#/components/schemas/QFIContainerInformation'

required:

- localSequenceNumber

QFIContainerInformation:

type: object

properties:

qFI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Qfi'

timeofFirstUsage:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

timeofLastUsage:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

qoSInformation:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/QosData'

qoSCharacteristics:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/QosCharacteristics'

userLocationInformation:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

uetimeZone:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

presenceReportingAreaInformation:

type: object

additionalProperties:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PresenceInfo'

minProperties: 0

rATType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

servingNetworkFunctionID:

type: array

items:

$ref: '#/components/schemas/ServingNetworkFunctionID'

minItems: 0

3gppPSDataOffStatus:

$ref: '#/components/schemas/3GPPPSDataOffStatus'

RoamingChargingProfile:

type: object

properties:

triggers:

type: array

items:

$ref: '#/components/schemas/Trigger'

minItems: 0

partialRecordMethod:

$ref: '#/components/schemas/PartialRecordMethod'

RANSecondaryRATUsageReport:

type: object

properties:

rANSecondaryRATType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

qosFlowsUsageReports:

type: array

items:

$ref: '#/components/schemas/QosFlowsUsageReport'

Diagnostics:

type: integer

IPFilterRule:

type: string

QosFlowsUsageReport:

type: object

properties:

qFI:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Qfi'

startTimestamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

endTimestamp:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

uplinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

downlinkVolume:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

MAPDUSessionInformation:

type: object

properties:

mAPDUSessionIndicator:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/MaPduIndication'

aTSSSCapability:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AtsssCapability'

EnhancedDiagnostics5G:

$ref: '#/components/schemas/RanNasCauseList'

RanNasCauseList:

type: array

items:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/RanNasRelCause'

NodeFunctionality:

anyOf:

- type: string

enum:

- SMF

- SMSF # Included for backwards compatibility, shall not be used

- I-SMF

- type: string

ChargingCharacteristicsSelectionMode:

anyOf:

- type: string

enum:

- HOME\_DEFAULT

- ROAMING\_DEFAULT

- VISITING\_DEFAULT

- type: string

TriggerType:

anyOf:

- type: string

enum:

- FINAL

- ABNORMAL\_RELEASE

- QOS\_CHANGE

- VOLUME\_LIMIT

- TIME\_LIMIT

- EVENT\_LIMIT

- PLMN\_CHANGE

- USER\_LOCATION\_CHANGE

- RAT\_CHANGE

- SESSION\_AMBR\_CHANGE

- UE\_TIMEZONE\_CHANGE

- TARIFF\_TIME\_CHANGE

- MAX\_NUMBER\_OF\_CHANGES\_IN\_CHARGING\_CONDITIONS

- MANAGEMENT\_INTERVENTION

- CHANGE\_OF\_UE\_PRESENCE\_IN\_PRESENCE\_REPORTING\_AREA

- CHANGE\_OF\_3GPP\_PS\_DATA\_OFF\_STATUS

- SERVING\_NODE\_CHANGE

- REMOVAL\_OF\_UPF

- ADDITION\_OF\_UPF

- INSERTION\_OF\_ISMF

- REMOVAL\_OF\_ISMF

- CHANGE\_OF\_ISMF

- START\_OF\_SERVICE\_DATA\_FLOW

- GFBR\_GUARANTEED\_STATUS\_CHANGE

- HANDOVER\_CANCEL

- HANDOVER\_START

- HANDOVER\_COMPLETE

- ADDITION\_OF\_ACCESS

- REMOVAL\_OF\_ACCESS

- START\_OF\_SDF\_ADDITIONAL\_ACCESS

- type: string

TriggerCategory:

anyOf:

- type: string

enum:

- IMMEDIATE\_REPORT

- DEFERRED\_REPORT

- type: string

FailureHandling:

anyOf:

- type: string

enum:

- TERMINATE

- CONTINUE

- RETRY\_AND\_TERMINATE

- type: string

SessionFailover:

anyOf:

- type: string

enum:

- FAILOVER\_NOT\_SUPPORTED

- FAILOVER\_SUPPORTED

- type: string

3GPPPSDataOffStatus:

anyOf:

- type: string

enum:

- ACTIVE

- INACTIVE

- type: string

ResultCode:

anyOf:

- type: string

enum:

- SUCCESS

- END\_USER\_SERVICE\_DENIED

- type: string

PartialRecordMethod:

anyOf:

- type: string

enum:

- DEFAULT

- INDIVIDUAL

- type: string

RoamerInOut:

anyOf:

- type: string

enum:

- IN\_BOUND

- OUT\_BOUND

- type: string

Annex B (informative):Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2018-09 | SA#81 |  |  |  |  | Upgrade to change control version | 15.0.0 |
| 2018-12 | SA#82 | SP-181157 | 0001 | 1 | F | Correction on the Reference and Resource name | 15.1.0 |
| 2018-12 | SA#82 | SP-181157 | 0002 | 1 | F | Editorial Correction | 15.1.0 |
| 2018-12 | SA#82 | SP-181157 | 0003 | 1 | F | Data Type Applicability Correction | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0004 | 1 | F | Serving Node ID Correction | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0006 | 1 | F | Correction of Common Data reference in Nchf\_ConvergedCharging API | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0007 | 1 | F | Correction of references to TS 29.512, TS 29.514 and data types | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0008 | 1 | F | Clarification of requested units handling | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0009 | 1 | F | Remove of underscore in the API name | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0010 | 1 | F | Correction of data type for subscriber identifier | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0011 | - | F | Correction of response code in flow for Notify | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0012 | 1 | F | Allow updating of Notify URI | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0013 | 1 | F | Correction of overlapping results between Invocation result and Result code | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0014 | 1 | F | Correction of Invocation result at http ok | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0015 | 1 | F | Correction of Rating Group Id and Service Id to Uint32 | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0016 | 1 | F | Correction of name for Multiple Unit Information | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0018 | 1 | F | Correction of name for Multiple Unit Information | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0019 | 1 | F | Correction of missing http status code | 15.1.0 |
| 2018-12 | SA#82 | SP-181052 | 0020 | 1 | B | Addition of event based charging | 15.1.0 |
| 2018-12 | SA#82 | SP-181057 | 0021 | 1 | B | Introduction Data Volume Reporting for Option 4&7 | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0022 | 1 | F | Alignment for session identifier | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0023 | 1 | F | Correction on Charging Notification message | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0024 | 1 | F | Correction on Charging ID data type | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0025 | 1 | F | Correction on Reauthorizationdetails | 15.1.0 |
| 2018-12 | SA#82 | SP-181052 | 0026 | 2 | B | Data Type for SMS | 15.1.0 |
| 2018-12 | SA#82 | SP-181052 | 0027 | 1 | B | Introduce Binding for SMS charging | 15.1.0 |
| 2018-12 | SA#82 | SP-181052 | 0028 | 1 | B | Introduce OpenAPI extension for SMS charging | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0029 | - | F | Failure Handling Mechanism Clarification | 15.1.0 |
| 2018-12 | SA#82 | SP-181059 | 0030 | - | F | Correction of Serving Network Function ID definition | 15.1.0 |
| 2019-03 | SA#83 | SP-190116 | 0031 | 1 | F | Correction of create operation description for event | 15.2.0 |
| 2019-03 | SA#83 | SP-190115 | 0032 | 1 | F | Correction of data type associated to volume | 15.2.0 |
| 2019-03 | SA#83 | SP-190214 | 0033 | 3 | F | Correction on reference for common data types | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0034 | 1 | F | Correction of inconsistencies in data types | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0035 | 1 | F | Correction of NF Consumer Information | 15.2.0 |
| 2019-03 | SA#83 | SP-190117 | 0036 | - | F | Correction of SMSF as NF Consumer | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0037 | - | F | Correction of validityTime data type | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0038 | 1 | F | Correction of API versioning and externalDocs field | 15.2.0 |
| 2019-03 | SA#83 | SP-190212 | 0039 | 4 | F | Correction of Qos Information | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0040 | 1 | F | Correct missing Session Identifier | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0041 | 1 | F | Correct faults in yaml part | 15.2.0 |
| 2019-03 | SA#83 | SP-190115 | 0042 | 1 | F | Correction of User Information | 15.2.0 |
| 2019-03 | SA#83 | SP-190115 | 0043 | - | F | Correction of dnn data type | 15.2.0 |
| 2019-03 | SA#83 | SP-190213 | 0044 | 3 | F | Correction of serving Network Function | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0045 | 1 | F | Correction of Multiple Unit Information in ChargingDataResponse | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0046 | 1 | F | Correction of trigger in ChargingDataResponse | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0048 | 1 | F | Correction of RANSecondaryRATUsageReport occurrence | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0052 | - | F | Correcting of table for bindings | 15.2.0 |
| 2019-03 | SA#83 | SP-190115 | 0054 | 1 | F | Correction of UE IP Addresses | 15.2.0 |
| 2019-03 | SA#83 | SP-190116 | 0055 | - | F | Correction on local sequence nb | 15.2.0 |
| 2019-03 | SA#83 |  |  |  |  | Editorial corrections in the OPENAPI (MCC) | 15.2.1 |
| 2019-06 | SA#84 | SP-190384 | 0057 | - | F | Add the reference for SMS charging | 15.3.0 |
| 2019-06 | SA#84 | SP-190384 | 0058 | 1 | F | Correct the failure handling | 15.3.0 |
| 2019-06 | SA#84 | SP-190384 | 0063 | 1 | F | Correction on errors description | 15.3.0 |
| 2019-06 | SA#84 | SP-190384 | 0064 | - | F | Correction on Gateway timeout code | 15.3.0 |
| 2019-06 | SA#84 | SP-190384 | 0065 | - | F | Correction of used unit container attributes | 15.3.0 |
| 2019-06 | SA#84 | SP-190383 | 0066 | 1 | F | Correction on binding | 15.3.0 |
| 2019-06 | SA#84 | SP-190383 | 0067 | - | F | Correction of trigger type for start of service data flow | 15.3.0 |
| 2019-06 | SA#84 | SP-190383 | 0068 | 1 | F | Correction of trigger type unit count inactivity timer | 15.3.0 |
| 2019-06 | SA#84 | SP-190383 | 0069 | 1 | F | Correction of Nchf\_ConvergedCharging release usage | 15.3.0 |
| 2019-06 | SA#84 | SP-190383 | 0070 | 1 | F | Correction of missing http status codes | 15.3.0 |
| 2019-06 | SA#84 | SP-190522 | 0072 | - | F | Correction on the OpenAPI version | 15.3.0 |
| 2019-06 | SA#84 | SP-190381 | 0056 | 1 | B | Definition of data model for interworking with EPC | 16.0.0 |
| 2019-06 | SA#84 | SP-190382 | 0059 | 1 | B | Add Offline only charging service API name | 16.0.0 |
| 2019-06 | SA#84 | SP-190382 | 0060 | 1 | B | Add Offline only charging service API resource definition | 16.0.0 |
| 2019-06 | SA#84 | SP-190382 | 0061 | 1 | B | Add Offline only charging service API data model | 16.0.0 |
| 2019-06 | SA#84 | SP-190382 | 0062 | 1 | B | Add Offline only charging service API error handling | 16.0.0 |
| 2019-06 | SA#84 | SP-190382 | 0071 | - | B | Add Offline only charging service operations | 16.0.0 |
| 2019-09 | SA#85 | SP-190757 | 0073 | 1 | B | Modify the Charging ID | 16.1.0 |
| 2019-09 | SA#85 | SP-190757 | 0074 | 1 | B | Definition of data model for interworking with EPC | 16.1.0 |
| 2019-09 | SA#85 | SP-190758 | 0075 | 1 | B | Correct Offline only charging service API resource definition | 16.1.0 |
| 2019-09 | SA#85 | SP-190758 | 0076 | 1 | B | Add Offline only charging service API data model | 16.1.0 |
| 2019-09 | SA#85 | SP-190758 | 0077 | 1 | B | Add Simple data types and enumerations for offline only charging service API data model | 16.1.0 |
| 2019-09 | SA#85 | SP-190758 | 0078 | 1 | B | Add Bindings of common CDR field for Offline only charging service API | 16.1.0 |
| 2019-09 | SA#85 | SP-190758 | 0079 | 1 | B | Add Offline only charging open API schema | 16.1.0 |
| 2019-09 | SA#85 | SP-190854 | 0080 | 2 | B | Update Open API for interworking | 16.1.0 |
| 2019-09 | SA#85 | SP-190761 | 0082 | 1 | A | Correction of nfConsumerIdentification and usedUnitContainer | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0084 | 1 | A | Correction of TriggerCategory and Triggers | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0086 | 1 | A | Correction of Report Time in QFI Container Information | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0088 | 1 | A | Correction of SubscriptionIdentificationType | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0092 | 1 | A | Correction of multipleQuotaInformation | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0094 | 1 | A | Correction of HTTP Status Codes | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0110 | - | A | Correct the QoS change trigger | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0111 | 1 | A | Add the selection mode in PDU session information | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0114 | 1 | A | Event based charging mechanism | 16.1.0 |
| 2019-09 | SA#85 | SP-190840 | 0115 | 1 | A | Bindings of common field correction | 16.1.0 |
| 2019-09 | SA#85 | SP-190840 | 0116 | 1 | A | Coordination of attribute Presence condition | 16.1.0 |
| 2019-09 | SA#85 | SP-190840 | 0117 | 1 | A | Bindings for 5G data connectivity correction | 16.1.0 |
| 2019-09 | SA#85 | SP-190840 | 0118 | 1 | A | Correction of data structure of response body | 16.1.0 |
| 2019-09 | SA#85 | SP-190840 | 0119 | - | A | Correction of serving Network Function identifier | 16.1.0 |
| 2019-09 | SA#85 | SP-190750 | 0122 | 1 | F | Correction of AF Charging Identifier naming | 16.1.0 |
| 2019-09 | SA#85 | SP-190840 | 0124 | - | A | Corrections on OpenAPI | 16.1.0 |
| 2019-09 | SA#85 | SP-190750 | 0126 | - | B | Correction on OpenAPI version | 16.1.0 |
| 2019-09 | SA#85 | SP-190762 | 0127 | - | A | Correction of version numbering | 16.1.0 |
| 2019-09 | SA#85 |  |  |  |  | Correction of history table and adding correct version of CR 0080 (MCC) | 16.1.1 |
| 2019-12 | SA#86 | SP-191162 | 0144 | 1 | A | Add the Service Specification Information | 16.2.0 |
| 2019-12 | SA#86 | SP-191159 | 0145 | 1 | F | Add the QoS characteristics | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0146 | 1 | A | Add the QNC support | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0147 | 3 | A | Clarify the QoS change trigger | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0150 | 1 | A | Correction of Nchf\_ConvergedCharging\_Release operation | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0151 | - | A | Correction of subscriberIdentifier | 16.2.0 |
| 2019-12 | SA#86 | SP-191159 | 0152 | 1 | F | Corrections on OpenAPI for UsedUnitContainer | 16.2.0 |
| 2019-12 | SA#86 | SP-191153 | 0153 | 2 | B | Introduce AMF in Nchf Converged Charging | 16.2.0 |
| 2019-12 | SA#86 | SP-191159 | 0154 | 1 | F | Add Retransmission IE for alignment with TS 32.290 | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0156 | 1 | A | Correction InvocationResult description and binding | 16.2.0 |
| 2019-12 | SA#86 | SP-191159 | 0157 | 1 | F | Correction of yaml | 16.2.0 |
| 2019-12 | SA#86 | SP-191159 | 0158 | 1 | F | Correction of pDUSessionChargingInformation | 16.2.0 |
| 2019-12 | SA#86 | SP-191154 | 0159 | 1 | B | Adding Exposure Function Northbound API Specified Data Type | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0163 | 1 | A | Alignment with TS 29.501 template | 16.2.0 |
| 2019-12 | SA#86 | SP-191153 | 0164 | - | B | Introduce OpenAPI for AMF charging | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0171 | 1 | A | Correction of Notify Response | 16.2.0 |
| 2019-12 | SA#86 | SP-191205 | 0173 | 2 | A | Correction of ChargingNotifyResponse description | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0175 | 1 | A | Correction on the Resource URI | 16.2.0 |
| 2019-12 | SA#86 | SP-191167 | 0179 | 1 | B | Adding I-SMF related trigger type | 16.2.0 |
| 2019-12 | SA#86 | SP-191167 | 0180 | 1 | B | Add I-SMF as a new serving network function | 16.2.0 |
| 2019-12 | SA#86 | SP-191203 | 0183 | 2 | A | Add Session-AMBR change trigger | 16.2.0 |
| 2019-12 | SA#86 | SP-191154 | 0186 | 1 | B | Addition of binding for exposure function northbound API | 16.2.0 |
| 2019-12 | SA#86 | SP-191154 | 0187 | 1 | B | Addition of attributes in yaml for exposure function northbound API | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0189 | - | A | Correction to NF consumer identification | 16.2.0 |
| 2019-12 | SA#86 | SP-191161 | 0191 | 1 | A | Correction of binding for 5G data connectivity | 16.2.0 |
| 2019-12 | SA#86 | SP-191159 | 0192 | - | F | Correction OpenAPI syntax | 16.2.0 |
| 2019-12 | SA#86 | SP-191153 | 0193 | 1 | B | Introduction of Binding for AMF Charging | 16.2.0 |
| 2019-12 | SA#86 | SP-191167 | 0194 | 1 | B | Add serving node information | 16.2.0 |
| 2019-12 | SA#86 | SP-191339 | 0198 | 1 | F | Update OpenAPI version | 16.2.0 |
| 2020-03 | SA#87E | SP-200170 | 0199 | - | F | Update of Serving Network Function ID | 16.3.0 |
| 2020-03 | SA#87E | SP-200248 | 0208 | 1 | F | Correct the style for TriggerType in OpenAPI | 16.3.0 |
| 2020-03 | SA#87E | SP-200166 | 0209 | - | B | Update OpenAPI version | 16.3.0 |
| 2020-07 | SA#88E | SP-200510 | 0216 | - | A | Missing AMF as network function | 16.4.0 |
| 2020-07 | SA#88E | SP-200484 | 0217 | 1 | F | Missing event limit in trigger type | 16.4.0 |
| 2020-07 | SA#88E | SP-200484 | 0219 | - | F | Missing downlink volume in QFI container | 16.4.0 |
| 2020-07 | SA#88E | SP-200484 | 0220 | - | F | Correction of content problem, callback and version | 16.4.0 |
| 2020-07 | SA#88E | SP-200522 | 0221 | 2 | F | Add the Retransmission Indicator in Open API | 16.4.0 |
| 2020-07 | SA#88E | SP-200484 | 0224 | 1 | B | Add the reference about the storage of OPENAPI in FORGE | 16.4.0 |
| 2020-07 | SA#88E | SP-200505 | 0226 | 1 | B | Add description on identifier for 5G RG and FN RG | 16.4.0 |
| 2020-07 | SA#88E | SP-200507 | 0228 | 1 | F | Correction of NodeFunctionality | 16.4.0 |
| 2020-07 | SA#88E | SP-200485 | 0231 | - | B | Introduce TS 29.500 and TS 29.501 full applicability | 16.4.0 |
| 2020-07 | SA#88E | SP-200485 | 0232 | 1 | F | Correct the PDU address | 16.4.0 |
| 2020-07 | SA#88E | SP-200485 | 0233 | 1 | F | Correct the Charging Data Response for NEF charging | 16.4.0 |
| 2020-07 | SA#88E | SP-200485 | 0237 | 1 | F | Correct offline only charging service API due to maintainance | 16.4.0 |
| 2020-07 | SA#88E | SP-200485 | 0240 | 1 | F | Correcting pduSessionInformation as optional | 16.4.0 |
| 2020-07 | SA#88E | SP-200508 | 0242 | - | B | Adding CHFCQM as supported feature | 16.4.0 |
| 2020-07 | SA#88E | SP-200486 | 0244 | - | A | Open API version Update | 16.4.0 |
| 2020-07 | SA#88E |  |  |  |  | Adding the yaml file to the zip | 16.4.1 |
| 2020-07 | SA#88E |  |  |  |  | Addressing two implementation errors in the annex Nchf\_ OfflineOnlyCharging API | 16.4.2 |
| 2020-09 | SA#89e | SP-200740 | 0245 | 1 | F | Clarify Charging information 5GC interworking with EPC | 16.5.0 |
| 2020-09 | SA#89e | SP-200813 | 0246 | - | F | Corrections in names and cardinality for attributes | 16.5.0 |
| 2020-09 | SA#89e | SP-200813 | 0247 | 1 | F | Authorization of CHF services access by OAuth 2.0 | 16.5.0 |
| 2020-09 | SA#89e | SP-200733 | 0248 | 1 | B | Introduction of ATSSS | 16.5.0 |
| 2020-09 | SA#89e | SP-200745 | 0249 | 1- | B | Introduction of NSM charging information | 16.5.0 |
| 2020-09 | SA#89e | SP-200742 | 0251 | - | F | Charging characteristics not consistently defined | 16.5.0 |
| 2020-09 | SA#89e | SP-200813 | 0252 | 1 | F | Correction of missing AF Charging Id in string format | 16.5.0 |
| 2020-09 | SA#89e | SP-200813 | 0254 | - | F | Correction to tariffTimeChange with UTC time | 16.5.0 |
| 2020-09 | SA#89e | SP-200741 | 0256 | 1 | F | Missing suspend of quota management | 16.5.0 |
| 2020-09 | SA#89e | SP-200743 | 0261 | 1 | B | Add the NSPA charging attribute for convergedcharging service | 16.5.0 |
| 2020-09 | SA#89e | SP-200817 | 0262 | 1 | F | Add timeLimit and eventLimit | 16.5.0 |
| 2020-09 | SA#89e | SP-200813 | 0263 | 1 | F | Update cardinality for event time stamps | 16.5.0 |
| 2020-09 | SA#89e | SP-200742 | 0265 | 1 | A | Correction on Converged Charging and Requested Unit handling | 16.5.0 |
| 2020-09 | SA#89e | SP-200740 | 0267 | - | F | Add ePDG as serving node | 16.5.0 |
| 2020-09 | SA#89e | SP-200742 | 0268 | - | A | Update OpenAPI version | 16.5.0 |
| 2020-09 | SA#89e |  |  |  |  | Correction of various CR implementation errors | 16.5.1 |
| 2020-12 | SA#90e | SP-201071 | 0271 | 1 | A | Correction of TriggerType | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0272 | - | F | Add Multi-homed PDU Address in CHF-CDR for IPv6 multi-homing | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0275 | 1 | F | Add the QNC subscription | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0277 | 1 | F | Add the enhanced Diagnostics for 5G Charging | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0278 | 1 | F | Correct the InvocationSequenceNumber | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0280 | - | F | Correct the bindings for 5G data connectivity | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0281 | 1 | F | Correct the Open API | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0282 | 1 | F | Correction on missing NEF and PGW-C+SMF as NF consumers | 16.6.0 |
| 2020-12 | SA#90e | SP-201049 | 0285 | 1 | A | Correcting charging id availability for all NF | 16.6.0 |
| 2020-12 | SA#90e | SP-201072 | 0287 | 1 | A | Correcting SMS message types | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0288 | - | F | Correcting binding of event time stamp in SMS | 16.6.0 |
| 2020-12 | SA#90e | SP-201051 | 0289 | - | F | Correction of roamer in out from SMSF | 16.6.0 |
| 2020-12 | SA#90e | SP-201088 | 0294 | - | A | Update OpenAPI version | 16.6.0 |
| 2020-12 | SA#90e | SP-201088 | 0301 | - | F | Correction of not quota management tariff time trigger | 16.6.0 |
| 2020-12 | SA#90e | SP-201088 | 0302 | - | F | Correction of SMS TP status value | 16.6.0 |
| 2020-12 | SA#90e |  |  |  |  | Correcting implementation mistake from CR0277 | 16.6.1 |
| 2021-03 | SA#91e | SP-210166 | 0306 | 1 | F | Missing eventLimit in trigger and OpenAPI | 16.7.0 |
| 2021-03 | SA#91e | SP-210146 | 0309 | 1 | F | Correcting binding for iPv6dynamicPrefixFlag | 16.7.0 |
| 2021-03 | SA#91e | SP-210146 | 0310 | - | F | Correcting NEF naming | 16.7.0 |
| 2021-03 | SA#91e | SP-210159 | 0312 | 1 | F | Correction on different identities for NEF charging | 16.7.0 |
| 2021-03 | SA#91e | SP-210158 | 0313 | - | F | Correction on missing MnS producer | 16.7.0 |
| 2021-03 | SA#91e | SP-210163 | 0314 | - | F | Correction on missing attributes for AMF Charging | 16.7.0 |
| 2021-03 | SA#91e | SP-210158 | 0315 | 1 | F | Add the Bindings for NSM Charging | 16.7.0 |
| 2021-03 | SA#91e | SP-210146 | 0317 | 1 | F | Optional header clarification | 16.7.0 |
| 2021-03 | SA#91e | SP-210146 | 0318 | - | F | Update OpenAPI version | 16.7.0 |
| 2021-06 | SA#92e | SP-210418 | 0320 | 1 | F | Correct the Nchf\_ OfflineOnlyCharging API resource definition | 16.8.0 |
| 2021-06 | SA#92e | SP-210418 | 0321 | - | F | Correct the Nchf\_ ConvergedCharging API resource definition | 16.8.0 |
| 2021-06 | SA#92e | SP-210398 | 0323 | 1 | F | Correction on Presence Reporting Areas(s) subscription in AMF | 16.8.0 |
| 2021-06 | SA#92e | SP-210418 | 0324 | - | F | Correction on missing binding attributes | 16.8.0 |
| 2021-06 | SA#92e | SP-210400 | 0325 | 1 | F | Correction on PDU address using DHCPv6 for connected RG to 5GC | 16.8.0 |
| 2021-06 | SA#92e | SP-210413 | 0328 | 1 | F | Correcting feature handling for ETSUN | 16.8.0 |
| 2021-07 | SA#92e |  |  |  |  | Fixing OPENAPI version and copyright dates | 16.8.1 |
| 2021-09 | SA#93e | SP-210886 | 0335 | 1 | F | Clarify the Presence Reporting Area information | 16.9.0 |
| 2021-09 | SA#93e | SP-210886 | 0336 | - | F | Correction on the Used Unit container in the QFIContainerInformation | 16.9.0 |
| 2021-09 | SA#93e | SP-210886 | 0337 | 1 | F | Clarify the User Location information | 16.9.0 |
| 2021-09 | SA#93e | SP-210886 | 0342 | - | F | Update OpenAPI version | 16.9.0 |
| 2021-12 | SA#94e | SP-211485 | 0352 | 3 | F | Alignment of the charging data request and response | 16.10.0 |
| 2021-12 | SA#94e | SP-211485 | 0359 | - | F | Update OpenAPI version | 16.10.0 |
| 2022-03 | SA#95e | SP-220185 | 0366 | 1 | F | Extensibility Mechanisms for charging | 16.11.0 |
| 2022-03 | SA#95e | SP-220170 | 0373 | - | F | Correcting quota management suspended | 16.11.0 |
| 2022-06 | SA#96 | SP-220564 | 0384 | 1 | F | Correction on the identifiers for NEF API Charging information | 16.12.0 |
| 2022-06 | SA#96 | SP-220565 | 0399 | 1 | F | Correction on the Time attribute | 16.12.0 |
| 2022-06 | SA#96 | SP-220565 | 0406 | - | F | Update Open API version | 16.12.0 |
| 2022-09 | SA#97e | SP-220853 | 0412 | 1 | F | Correction of IPv6 prefixes in PDU address | 16.13.0 |
| 2022-09 | SA#97e | SP-220853 | 0428 | - | F | Update Open API version | 16.13.0 |
| 2022-09 | SA#98e | SP-221171 | 0433 | - | F | Correcting SMSF as Node Functionality | 16.14.0 |
| 2022-09 | SA#98e | SP-221171 | 0441 | - | F | Correction of Trigger Types in Offline Charging | 16.14.0 |
| 2022-09 | SA#98e | SP-221171 | 0443 | 1 | F | Case Mismatch for Management Operation | 16.14.0 |
| 2022-09 | SA#98e | SP-221195 | 0447 | 1 | F | Correction on the Nchf\_OfflineOnlyCharging | 16.14.0 |
| 2022-09 | SA#98e | SP-221171 | 0449 | - | F | Update Open API version | 16.14.0 |
| 2023-09 | SA#101 | SP-230942 | 0496 | - | F | Correction to triggerType in Nchf\_ConvergedCharging API | 16.15.0 |
| 2023-09 | SA#101 | SP-230942 | 0500 | - | F | Update OpenAPI version | 16.15.0 |